AN EXAMINATION OF SIGNIFICANT VARIABLES USED BY COURTS IN WORTHLESS STOCK CASES

By

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TABLE OF CONTENTS

Page

ACKNOWLEDGEMENTS. ii

ABSTRACT. v

CHAPTER

I INTRODUCTION 1

Tax Treatment for Worthless Security Losses. . 1
Significance of the Problem. 4
Research Methodology 8
Limitations. 16
Related Research 18
Summary of Chapter Contents. 22
Notes. 23

II HISTORICAL BACKGROUND. 27

Statutory Provisions 27
Administrative Interpretations 33
Judicial Decisions 33
Notes. 39

III VARIABLE IDENTIFICATION. 41

Data Base. 41
Research Methodology 42
Selection of Variables for Analysis. 45
Operational Definitions of Variables 47
Notes. 62

IV RESEARCH METHODOLOGY 65

Method of Analysis 65
Coding Techniques. 66
Coding Individual Cases. 69
Research Question 2. 71
Research Question 3. 80
Research Question 4. 81
Research Question 5. 82
Research Question 6. 83
Limitations. 85
Notes. 86

Page

V EMPIRICAL RESULTS. 88

Research Question 2. 88
Research Question 3. 110
Research Question 4. 113
Research Question 5. 118
Research Question 6. 120
Comparison with Related Study. 126
Notes. 127

VI SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS. . . 129

Summary and Conclusions. 131
Recommendations. 138
Suggestions for Future Research. 140
Note 141

APPENDIX

LIST OF COURT DECISIONS ON WORTHLESS STOCK. 142

BIBLIOGRAPHY. 159

BIOGRAPHICAL SKETCH 178

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The conditions necessary to establish that stock is worthless for purposes of loss recognition under Code Section 165(g) are not specified in the Internal Revenue Code, Treasury Regulations, or administrative interpretations of the Internal Revenue Service (IRS). This lack of guidance has allowed taxpayers and the IRS to differ in interpreting this provision, which has frequently resulted in litigation.

The purpose of this study is to develop mathematical models that identify the significant variables used by courts in worthless stock decisions. This information may be used by taxpayers in deciding how to resolve differences with the IRS and by tax policy-makers as a possible basis for developing provision(s) that specify conditions, which if satisfied, will qualify taxpayers for loss recognition under Code Section 165(g). Three hundred and forty-eight Tax Court and 59 Federal district court cases provided the data used in developing separate discriminant analysis and logit models for decisions from each court.

The decision models for the Tax Court and Federal district court decisions employed different variables. Both mathematical models were equal in their ability to predict the outcome of Tax Court decisions but differed slightly for the Federal district court decisions.

A secondary research question in this study was to assess sensitivity of the discriminant models to the introduction of random and systematic errors in coding the variables used to construct these models. Both discriminant models were robust with respect to these types of coding errors.

Findings of this study indicate several conclusions. First, mathematical models based on variables discussed in court decisions correctly predicted more than 80 percent of these decisions. Second, the discriminant analysis and logit models were similar in their ability to predict court decisions. Third, decision models for Tax Court and Federal district court decisions employed different variables. Fourth, discriminant models were robust with respect to the introduction of random and systematic coding errors.

CHAPTER I

INTRODUCTION

Taxpayers who hold securities that have declined in value to the point where they are worthless may deduct this loss for tax purposes, but it is not certain what a taxpayer must demonstrate to establish that a security is worthless for tax purposes.[1] This chapter presents a discussion of the tax treatment for worthless security losses and problems that taxpayers may experience in attempting to claim a tax loss for securities that have become worthless. A research methodology is presented to provide information that may be useful in reducing the problems taxpayers may encounter in claiming a worthless security loss deduction. The limitations of this research design and related research are also presented. This chapter concludes with a summary of following chapter contents.

Tax Treatment for Worthless Security Losses

The general rule for the tax treatment of gains or losses realized from investments in securities requires recognition (inclusion in the computation of a taxpayer's taxable income or loss for the tax year when the change in value is realized) unless otherwise provided in the

Code.[2] Under this general rule, only losses that are realized by a sale or exchange can be recognized.[2] Losses that would otherwise be recognized under the general rule will be disallowed if they result from a sale to a related party defined by Code Section 267 or a "wash sale" transaction defined by Code Section 1091.[4] Taxpayers holding securities that decline in value to an amount that is either less than their adjusted basis or zero incur an economic loss that is not deductible under the general rule because the loss has not been realized through a sale or exchange.[5] If securities have suffered less than a total decline in value, a taxpayer may recognize this loss through a sale or exchange of the securities with another investor who is not a related party as defined by Code Section 267.

If the securities have declined in value to the point where they are worthless, it is highly unlikely another investor could be found who would be interested in acquiring these securities. In this situation, it appears a taxpayer would find himself in a position where an economic loss has been incurred that cannot be recognized for tax purposes. Fortunately for taxpayers who find themselves in this situation, Congress has provided a relief provision that allows for the recognition of losses from worthlessness sustained during the year that are not compensated by insurance or other means.[6]

Code Section 165(g) deals specifically with the deductibility of losses arising from worthless securities.

In general, this provision considers losses from worthless securities that are capital in nature and becomes worthless during the taxable year, as a loss from the sale or exchange of a capital asset on the last day of that taxable year. Losses from the sale of securities that are not capital assets (i.e., inventory), or that are not acquired in a transaction with a profit motive do not qualify for loss recognition under Code Section 165(g).[7] Losses that qualify for recognition under Section 165(g) may be classified as either long-term or short-term capital losses depending upon the length of time they were owned prior to becoming worthless.[8] Any net short-term capital loss and/or net long-term capital loss that remains after the netting process of Code Section 1222 is applied may generally be deducted up to a combined total of up to $3,000 from ordinary income.[9] Any net capital losses exceeding the $3,000 annual limit are carried forward to subsequent taxable years as either short-term or long-term capital losses.[10]

Initially, it would appear that Code Section 165(g) solves the loss recognition problem of taxpayers who hold securities that become worthless. However, the provision only specifies that a deduction is available for losses incurred when securities become worthless during the taxable year. It does not specify what evidence is sufficient to establish that a security is, in fact, worthless, nor does it specify at what point in time the security became worthless.

Unfortunately, neither administrative or judicial pronouncements adequately answer the question of what evidence definitely establishes that a security is worthless. Without any definite criteria to establish when Code Section 165(g) applies, taxpayers have nothing they can specifically rely on to refute an IRS challenge of their entitlement to loss recognition under this provision. Without statutory, administrative, or judicial guidelines the IRS may challenge a taxpayer's claim for loss recognition under this provision regardless of the evidence a taxpayer may provide to establish the worthlessness of a security.

Significance of the Problem

If challenged by the IRS, a taxpayer's deduction for loss recognition under Code Section 165(g) can be disallowed if the taxpayer cannot establish that worthlessness occurred in the claimed year of loss.[11] Failure to establish worthlessness could obviously result in a loss of all tax benefits related to the claimed loss. However, if worthlessness occurred in other than the claimed year of loss, the tax benefits of the loss deduction may be effected in several different ways.[12]

The loss could be shifted to a year closed by the statute of limitations which would result in a total loss of the deduction. However, this outcome is not as likely as it may initially appear because Congress has replaced the normal three-year statute of limitations with a seven-year period for issues involving worthless securities.[13] Even if the special statute of limitations can preserve a loss deduction, it is possible for a taxpayer to lose the tax benefits of a claimed loss. This outcome may occur if, in the year worthlessness is determined to have occurred, the taxpayer has a net operating loss or has other capital losses that exceed the annual deduction limitation.[14]

Taxpayers may experience a partial reduction in the value of their tax benefit if the loss is shifted to another taxable year. This result may occur either through a difference in marginal tax rates for the affected years, a change in the character of the loss, or a deferral of the tax benefit of the loss to a subsequent period.

If the loss is shifted to a preceding or subsequent taxable year when the taxpayer is in a lower tax bracket, the amount of the reduction equals the amount of the loss times the change in marginal rates.[15] Deferral of the loss deduction to a later taxable year causes the value of the tax benefit to be reduced even though the taxpayer's marginal tax rate remains the same. The loss equals the amount of the loss times the marginal tax rate times the time value of money for the period of time between the original date on which the tax benefit would have been received and the "new" date for receiving the loss benefit. In the event that a short-term capital loss is shifted to a subsequent period where it may only be deducted as a long-term capital loss, the value of the deduction will be reduced by fifty percent plus the lost time-value of money.[16] If the taxpayer has a net long-term and/or short-term capital loss in this subsequent taxable year, recognition of the long-term capital loss from the shifted worthless stock loss deduction may be limited by the $3,000 annual limit on deducting net long-term capital losses.

In order to eliminate these possible negative consequences, it may occur to certain taxpayers that selling securities they consider to be worthless to a person (other than a related party subject to the provisions of Code Section 267) for a nominal amount could bring recognition of their loss under the certainty of the general gain or loss recognition rules. This strategy may not be a sound alternative because in some cases the courts have looked through the form of this type of transaction to its substance. In doing so, they have held that Code Section 165(g) is the operative provision when worthlessness is determined to have occurred in a year other than the year of "sale."[17] Such a decision would return the taxpayer to the original problem he attempted to avoid.

The lack of guidance available to taxpayers who possess securities that they feel have declined in value to the point they are worthless (and therefore eligible for recognition as a loss) creates a situation where affected taxpayers cannot determine with total certainty whether this deduction will be allowed. This uncertainty may lead to an inefficient allocation of resources by both taxpayers and the IRS. Extra out-of-pocket expenses and opportunity costs could be incurred by both parties in defending different conclusions based on an identical set of facts and circumstances. In fact, the courts have even suggested that taxpayers incur such additional costs to avoid possible challenges to their deduction. Judge Augustus Hand offered the following advice in denying a claim that he found two years too late

> In cases like this the taxpayer is at times in a difficult position in determining in what year to claim a loss. The only safe practice, we think, is to claim a loss for the earliest year when it may possibly be allowed and to renew the claim in subsequent years if there is any reasonable chance of its being applicable to the income of those years.[18]

In economics literature, certainty has been identified as one of the major attributes of ideal system of taxation.[19] Accordingly, efforts directed at reducing uncertainty in our current taxation system provide a way to move a small step closer to an ideal system. Several general approaches exist for reducing uncertainty in the worthless securities area. Statutory guidance could be provided, administrative interpretations could be issued, or an improved understanding of how the courts determine worthlessness could be developed. Regardless of the form any improvement may take, an operational definition of worthlessness is required. This study seeks to identify the significant variables and to determine how they may be combined for the purpose of providing a basis for such a definition of worthlessness.

Research Methodology

Research Questions

The six major research questions to be examined in this dissertation are

Research Question 1. What variables or factors have been relevant in court decisions that have determined whether stock is worthless for purposes of loss recognition under Code Section 165(g)?

Research Question 2. Mathematically, how have the courts weighted the variables identified in Question 1?

Research Question 3. How accurate is the model developed in answering Question 2 when compared to an heuristic model based on a synthesis of statutory provisions and court decisions?

Research Question 4. Do differences in the court of original jurisdiction affect the accuracy of the models from Questions 2 and 3?

Research Question 5. Are the models from Questions 2 and 3 temporally stable?

Research Question 6. How sensitive is the model from Questions 2 to errors in coding the independent variables selected for analysis?

Data Collection

Written court opinions that deal with loss recognition for worthless securities will be used to identify the relevant variables. Because Code Section 165(g) mentions several different classes of securities that may be eligible for loss recognition (stock--both common and preferred, rights to subscribe to or receive stock, and debt instruments), it is possible to identify variables that relate to all, some, or just one of these categories. Any form of combined analysis is considered inappropriate because what may indicate worthlessness for one class of securities may not indicate the same condition for another class.

For example, in a corporate liquidation, only the common stock would be worthless where bondholders and preferred shareholders are entitled to liquidating distributions at some future date and the common shareholders are entitled to nothing. To avoid the inclusion of variables with possible double meanings, only one class of security--common stock--will be examined in this study. Common stock has been selected because it provides the largest set of observations from cases dealing with loss recognition for worthless security purposes. The examination of other classes of securities may be an appropriate topic for future resarch.

The identification of relevant decisions through the end of calendar year 1983 was accomplished through a combined use of the LEXIS legal research service and manual legal research techniques.[20] Only those cases that were decided in a court of original jurisdiction (Tax Court, U.S. Claims Court, and Federal district courts) and not overturned by an appellate court's review were included in this study. This restriction was made to eliminate observations that were either redundant or contradictory. Including affirming appellate decisions could result in the development of models that include the same set of variables and same finding twice for these cases but only once for nonappealed cases. Reversed decisions and related appellate decisions, if included in the construction of a model, could result in an underestimation of the importance for the variables occurring in these cases since they are not consistently associated with the court's decision. If a single case decided the worthlessness of stock for more than one company, the decisions were independently considered.

Appendix A lists all cases that were found and their respective courts of original jurisdiction. Since there were 348 decisions from the Tax Court, 59 decisions from the Federal district courts, and 8 decisions from the U.S. Claims Court, it was decided that the decisions from the U.S. Claims Court would be deleted and that the decisions from the other two forums would be analyzed separately. Separate analysis was selected to avoid possible nonrepresentative results in the event the Tax Court and Federal district courts use different decision models. To determine whether the models developed in this study could be significantly influenced by fact situations related to the stock of a single corporation, a review of the selected decisions was performed to determine how many times the stock of a single corporation was involved in more than one decision. This review revealed only three decisions related to the stock of a single corporation which indicates approximate uniqueness in the fact situations considered by the models in this research.

Research Question 1

The relevant factors considered by the courts in deciding loss recognition cases involving worthless securities were drawn from examination of the following sources: (1) specific factors mentioned by tax commentators and tax reporting services as indicia of worthlessness and (2) factors not included in the preceding category that were found in the written opinions of the cases examined.

The factors compiled by this process were included in this study only if they were mentioned in 10 percent or more of the cases. A summary of all variables that were considered for possible inclusion and the variables actually used in this study is contained in Chapter III. Additionally, Chapter III discusses the operational definitions of, and the coding scheme used for, the variables selected for analysis.

Research Question 2

Two different types of mathematical models will be used to determine how the courts have weighted the variables identified in Question 1 when making decisions regarding worthlessness. First, a multiple discriminant analysis model will be developed based on the assumption that judges linearly combine the identified variables. Second, a logit analysis model will be constructed based on the alternative assumption that a non-linear combination of the identified variables may have been used by the judges. Both models will be constructed through the use of computer software packages.

Research Question 3

An heuristic model of judges' decisions regarding worthlessness will be developed by using the variables identified in Question 1. First, it will be determined by using statutory provisions and court decisions whether each variable would most likely be associated with a finding that the security is worthless or with a finding that the security has value. Second, classification rules will be developed from the combinations of variables that would most likely lead to a finding that the security is worthless or that it has value.

The relative accuracy of the quantitative model developed in Question 2 and the heuristic model developed in

Question 3 will be calculated by determining the classification accuracy of each model. For the heuristic model, the classification accuracy will be determined by dividing the number of correctly classified decisions by the number of actual decisions. The classification accuracy of the quantitative model will similarly be calculated, but with some minor modifications. Since the heuristic model will be developed without the use of any of the characteristics of the population being considered, it will be possible to directly calculate its classification accuracy. However, since the quantitative models will be developed from the population of decisions, alternative procedures were necessary to avoid classification accuracy figures that indicate the models' ability to classify themselves instead of decisions not used in constructing these models.

Accordingly, classification accuracy of the quantitative models will be tested by the use of two different methods. For the 348 Tax Court decisions, a holdout sample will be used. The use of a holdout sample for Federal district court cases will not be possible because of the small population size (only 59 decisions). To test the classification accuracy of the Federal district court model, a jackknife validation procedure will be used. In this procedure, a discriminant function will be calculated for n - 1 decisions, where n is equal to the number of decisions in the population. This n - 1 discriminant function will then be used to classify the omitted decision. This process will be repeated n - 1 times and the number of correctly classified decisions will be used as an estimate of the model's classification accuracy.

Research Question 4

To determine whether different decision models were used in the Tax Court and Federal district courts, a model based on all decisions made by the Tax Court will be used to predict the outcome of decisions made in the Federal district courts and a model based on all of the Federal district court decisions will be used to predict the Tax Court decisions. The classification accuracy of the Federal district court decisions predicted by using the Tax Court model will then be compared with the classification accuracy of the Federal district court model when it is applied to Federal district court decisions. A comparison of the classification accuracies of the Tax Court decisions will be made in the same manner. Additionally, component variables in each model will be analyzed for possible differences.

Research Question 5

The temporal stability of the models will be tested in two ways. First, classification functions will be developed by using the first one-half of the decisions to classify the outcome of the second one-half of the decisions. Since there are only 59 Federal district court decisions they will not be considered in answering this question because further reduction of such a small population would most likely result in statistically invalid models. The first one-half of the Tax Court decisions made between 1921 and 1940 will be used to predict the second one-half of the loss decisions made between 1941 and 1983. Second, to assess the current validity of the models, their classification accuracy will be calculated and examined for differences when applied to the earliest 90 percent of the decisions and the most recent 10 percent. Again, only Tax Court decisions will be considered because of the relatively small population of Federal district court decisions.

Research Question 6

To determine how the models may be affected by errors in the coding of the independent variables, two types of errors will be considered. To assess sensitivity of the models to the introduction of random errors, the data being analyzed in this study will be modified by the introduction of random error to between 3 percent and 10 percent of the observations. The models developed from the data containing these random errors will be compared with models based on data not containing these introduced errors for differences in the weighting of individual variables and overall classification accuracy. Sensitivity to the introduction of systematic coding errors will be examined by comparing models that have had the coding of the two most significant variables changed with models having unchanged coding for differences in variable weighting and classification accuracy.

Limitations

The findings of this research may be affected by more than uncertainty regarding the appropriateness of various statistical and mathematical assumptions than have been made. Several conditions may result in differences between the factors actually considered by judges and the factors this research has associated with their decisions.

First, in tax litigation the burden of proof is placed on the taxpayer to demonstrate the IRS's position is invalid.[21] The application of this principle resulted in differing conclusions in three cases all of which dealt with the worthlessness of Middle West Utilities Company's common stock in 1932. Based on the information provided by the taxpayer in George H. Horning, the Board of Tax Appeals did not find the stock worthless in 1932.[22] However, based on different information presented by the taxpayers in Mary S. Peabody and Benjamin Mahler, the same court concluded that the common stock had become worthless in 1932.[23] Had these cases been decided in the reverse order, the court would have been aware of additional information that it could not cite as a basis for its decision.

Second, judges' written opinions may not include all variables presented for consideration since these opinions are not verbatim trial records. If a judge includes discussion of enough significant variables to justify his finding to a possible appellate review, he may not feel that it is necessary to discuss the factors he considers insignificant.

Third, it is possible that individual biases of the researcher may have resulted in the miscoding of some variables. To minimize the possibility of this type of error, 10 percent of the decisions were coded independently and compared with the original coding. Less than 1 percent of the originally coded variables were found to be incorrect. The nature of the coding errors were examined and found to be nonsystematic. The errors were then corrected. If this error rate is representative, the effect of individual coding bias on the results of this study should only be minimal, if measurable at all. Relevant to this assumption is the research of Pollard and Copeland. Their study found that introduction of a 3 percent error rate only reduced the classification accuracy of a discriminant model predicting the outcome of "tax home" cases by 2 percent.[24]

A final limitation to this study is found in the nature of the decisions themselves. Assuming that both taxpayers and the IRS would litigate the question of worthlessness only if each felt they had a good chance of winning, a number of disputes between these two parties, that were not litigated but were instead settled by compromise, have been eliminated from consideration. Accordingly, the results of this study may not be generalizable to all issues involving the worthlessness question.

Related Research

This study has links with prior research efforts that have used mathematical models to describe both judicial and nonjudicial classification decisions. The research design of this dissertation is primarily based on political science research, where the use of mathematical models to describe the judicial decision process originated, and tax-oriented accounting research, which has specifically applied this approach to the analysis of tax decisions. Other accounting research that has used mathematical models to describe nonjudicial decisions indicates this methodology is desirable for more reasons than its application in similar studies.

Mathematical Techniques in Judicial Decision Research

Political science research. The first research to use mathematical modeling to analyze judicial decisions was a 1957 study by Kort that examined right to counsel decisions made by the Supreme Court.[25] He assigned numerical values to factors mentioned by the judges and then summed these values to obtain a score for each case to predict the court's decision. In 1963, Kort refined this technique by using factor analysis to reduce the number of independent variables in his model. These independent variables were used to predict case outcomes through the use of a multiple regression model.[26]

In a subsequent study, Nagel used correlation analysis to predict the outcome of reapportionment cases.[27] In this study, Nagel suggested using discriminant analysis to analyze binary judicial decisions. Ulmer published the first research using discriminant analysis when he examined the voting behavior of Judge Felix Frankfurter in Supreme Court cases involving civil liberties issues.[28]

Tax research. Accountants have used mathematical models to analyze two major aspects of tax decisions. First, mathematical models have been used to determine the significance of factors contained in Treasury Regulations or binding appellate court decisions in tax decisions. Representative of this approach is Englebrecht and Rolfe's use of discriminant analysis to determine the significance of factors contained in the U.S. Supreme Court's decision in U.S. v. Davis on subsequent court decisions involving dividend equivalence in stock redemption issues.[29] Second, in areas where no specific guidelines have been developed for the courts to follow, tax researchers have used mathematical models to determine which factors have the greatest ability to predict the past behavior of the courts. This technique was applied by Stewart who used discriminant analysis and logit analysis to determine the factors employed by federal courts in deciding employee versus independent contractor issues.[30]

Directly related to this research is a study by Kilpatrick that used both discriminant analysis and logit analysis to model the Tax Court's decision process in eighty-four cases involving worthless stock issues.[31] In his 1984 study, a discriminant function using Insolvency Occurring During the Claim Year, Discontinuation of Operations During the Claim Year, Dissolution of the Company During the Claim Year, Bankruptcy Filed After the Claim Year, and Insolvency After the Claim Year as independent variables correctly predicted the outcome for 88.1 percent of the cases. Using the same set of independent variables a logit function correctly predicted 86.9 percent of the decisions. Also, temporal stability of the models was indicated. This study will differ from Kilpatrick's research in several major ways. First, the population of all Tax Court cases will be examined versus a sample of eighty-four. Second, Federal district court cases will also be examined. Third, an heuristic model is to be developed for comparison purposes. Fourth, the sensitivity of the models developed in this study will be examined with respect to the introduction of coding errors.

Non-Tax Research

Multiple discriminant analysis and logit analysis have been used in financial accounting research to study the relationship between selected financial ratios and business failure. Libby's work in this area has implications relevant to this study.[32] First, multiple discriminant analysis was used to describe how loan officers used financial ratios to predict bankruptcy, which indicates this technique has also been considered appropriate in the analysis of nonjudicial decisions. Second, but more importantly, the selection of discriminant analysis was justified, not only for its ability to accommodate binary dependent variables, but also for its compatability with psychological theory of decision making. Libby's theoretical justification is based on the ability of discriminant analysis to apply Brunswik's "lens model" in an experimental setting.[33] The lens model's major postulate is that environmental conditions are known to decision makers only in the form of cues related to those conditions and that the decision maker must weigh, assess, and combine these cues to predict the actual environmental conditions. Libby linked Brunswik's lens model to discriminant analysis through the ability of discriminant analysis to explain decision maker's predictions (discrete dependent variables) with a linear combination of environmental causes (independent variables).

A quantitative model, conceptually identical to the lens model, has been developed by Jensen and Horvitz to describe the judicial decision process.[34] Jensen and Horvitz's model relates judicial decisions to fact situations through weights judges assign to individual facts in their legal reasoning process. This model is based on the concepts of ratio decidendi, the reasoning process used by judges to apply rules of law to fact situations in cases they hear, and stare decisis, consistent application of the law by judges, both individually and collectively, in similar fact situations. The distinction between Jensen and Horvitz's judicial decision model and Brunswik's lens model is that Jensen and Horvitz's model addresses how individuals process information related to unknown events and Brunswik's model addresses how individuals process information related to known events.

These two models that explain decisions as a weighted combination of variables upon which decisions may be based provide theoretical support for the use of discriminant analysis in this research.

Summary of Chapter Contents

This study is divided into six chapters. Chapter I is the introduction to the study which includes a description of the nature and significance of the problem, the research questions selected to examine this problem, the basic research methodology that will be used, and the possible limitations of the study.

Chapter II provides a historical perspective of the statutory provisions and judicial decisions affecting the determination of whether or not a security is worthless for purposes of loss recognition.

Chapter III presents and applies the research methodology used to identify the variables of interest in this study which is the objective of Research Question 1.

Chapter IV contains a detailed outline of the research methodology selected to examine Research Questions 2 through 6.

Chapter V presents the models developed to describe the courts' decision-making behavior in answering Research Questions 2 through 6. Differences and similarities among these models are identified and evaluated.

Chapter VI summarizes the preceding chapters, discusses the implications of this study, and presents recommendations for future research.

Notes

[1] Code Section 165(g). All references are to the Internal Revenue Code of 1954 unless otherwise noted.

[2] Code Sections 1001(c) and 61(3).

[3] Code Section 1001(c).

[4] Code Section 267(b) specifies nine categories of related parties for which losses incurred on transactions involving these related parties are disallowed. Code Section 1091 generally defines a "wash sale" as sale in which a loss is realized but where substantially identical securities are acquired during either the 30-day period preceding or following the date of sale that permits the taxpayer to retain relatively the same economic position.

[5] Code Section 1001(c).

[6] Code Section 165(a).

[7] Code Section 1221 and Code Section 165(c).

[8] Code Section 1222(2) defines a short-term capital loss as a loss from the sale or exchange of a capital asset held for less than 6 months and Code Section 1222(4) defines a long-term capital loss as a loss from the sale or exchange of a capital asset held for more than 6 months.

[9] Code Section 1211(b) provides that net short-term capital losses be deducted first on a dollar-for-dollar basis and one-half of any net long-term capital losses may be deducted in reaching the $3,000 annual limit.

[10] Code Section 1212(b).

[11] Code Section 7453 and Tax Court Rule of Practice 32 place the burden of proof on the taxpayer.

[12] Since the primary role of the IRS is to collect revenues for the government, it is assumed the IRS would not challenge an incorrect position taken by a taxpayer, that if corrected, would result in a refund. Accordingly, only negative consequences will be considered in this study.

[13] Code Sections 6511(a) and 6511(d)(1).

[14] Generally, Code Section 1211 allows noncorporate taxpayers up to a $3,000 deduction for capital losses that exceed capital gains. Corporate taxpayers may only deduct capital losses to the extent they do not exceed capital gains.

[15] It is unlikely for the IRS to attempt to shift a deduction to a taxable year when the taxpayer has a higher marginal tax rate or to an earlier year that is not closed by the statute of limitations. However, if the taxpayer has a lower marginal tax rate in the earlier year, the IRS may attempt to shift the deduction to that earlier year.

[16] Code Section 1211(b).

[17] Grant B. Shipley, 17 TC 740 (1951) and Frank C. Rand, 40 BTA 233 (1941).

[18] Minnie K. Young v. Commissioner, 123 F.2d 597 (CA-2, 1941).

[19] G.P. Break and J.A. Pechman, Federal Tax Reform: The Impossible Dream (Washington, D.C.: Brookings Institution, 1975).

[20] LEXIS, a service of Mead Data Central, is a legal reference system that stores the texts of a large number of court cases in a computer accessible form. This system can provide a researcher with anything from a case cite to the complete text of any case (stored in the system) that

contains key words or phrases selected by the researcher. LEXIS stores Board of Tax Appeals and Tax Court decisions issued since 1924, Tax Court Memorandum decisions since 1942, District Court decisions since 1960, and U.S. Claims Court decisions since 1942. Manual research techniques were used to identify cases not stored by LEXIS.

[21] Code Section 7453 and Tax Court Rule of Practice 32 place the burden of proof on the taxpayer.

[22] George H. Horning, 35 BTA 897 (1937).

[23] Mary S. Peabody, 38 BTA 1086 (1938) and Benjamin Mahler, P-H BTA Memo Dec. 39,468 (1939).

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[31] B.G. Kilpatrick, The Determination of Worthless Securities Under Internal Revenue Code Sec. 165(g): Empirical Evidence from Judicial Decisions (Ph.D. dissertation, Oklahoma State University, 1984).

[32] R. Libby, "Accounting Ratios and the Prediction of Failure: Some Behavioral Evidence," 13(1) Journal of Accounting Research 150 (1975).

[33] E. Brunswik, The Conceptual Framework of Psychology (Chicago: University of Chicago Press, 1952).

[34] H.L. Jensen and J.S. Horvitz, "A Theoretical Framework for Quantifying Legal Decisions", 20(1) Jurimetrics Journal 121 (1979).

CHAPTER II

HISTORICAL BACKGROUND

This chapter presents a survey of statutory provisions, administrative interpretations, and judicial decisions related to the deductibility of worthless security losses.

Statutory Provisions

The Tariff Act of October 3, 1913, which introduced the first constitutionally valid federal tax on income, did not specifically allow a deduction for worthless securities. Instead, the Act allowed a deduction for losses in general, which included worthless security losses. Section II.B of this Act allowed individuals to deduct

> losses actually sustained during the year, that were not compensated for by insurance or otherwise, in computing net income subject to tax so long as these losses were incurred in a trade or arose from fire, storm, or shipwreck.

Corporations were also allowed to deduct uncompensated losses. However no restrictions on trade or casualty loss deductions applied.[1]

The Revenue Act of 1916 expanded the scope of losses that individuals could deduct by providing for the deductibility of

> losses not connected with a trade or business, but entered into for profit to the extent of profits therefrom.[2]

Additionally, this Act limited both individual and corporate loss deductions related to property held on March 1, 1913, to the fair market value of the property on that date.[3]

The general loss deduction provisions were again modified by the Revenue Act of 1918. This Act removed the "to the extent of profits therefrom" restriction that had applied to losses incurred in transactions entered into for profit, but not connected with a trade or business.[4]

The next change to effect the general loss deduction provisions occurred in the Revenue Act of 1934. The nature of what was deductible did not change, but the potential amount of the deduction was affected by the Act's limitation on the deductibility of capital losses.[5] Since most investors hold securities as capital assets, this change was of considerable importance. Commenting on this change in the deductibility of capital losses, the House Ways and Means Committee stated

> This provision is an important part of the new policy recommended for the treatment of capital gains and losses from the sale or exchange of property, as already described. It makes clear that individuals and corporations are entitled to deduct capital losses only to the extent of capital gains.[6]

The Revenue Act of 1934 also provided special treatment for worthless security losses. Since worthlessness does not occur through a sale or exchange, losses of this nature (even though related to capital assets) were deductable without regard to capital loss limitations. This exclusion of worthless securities losses from the capital loss limitation provisions of the 1934 Act was not changed by the Revenue Act of 1936.[7] This exclusion from the capital loss limitations was finally eliminated by the Revenue Act of 1938. In explaining this change, the House Ways and Means Committee offered the following explanation

> Under Section 23(e) of the Revenue Act of 1936 a loss sustained from securities becoming worthless which is deductible under that subsection is deductible in full and against ordinary income. In contrast thereto a loss sustained from the sale or exchange of such securities as are capital assets is not only subject to reduction by the percentage brackets of section 117(a) or that Act but can not be offset against ordinary income except to the extent of $2,000. This distinction in treatment is not satisfactory, since, in either case, the loss sustained by the taxpayer is a loss of capital and consequently should be treated similarly for tax purposes. This difference in treatment is eliminated by the bill. Section 23(g) thereof, dealing with capital losses, subjects losses arising from stock or stock rights becoming worthless to the same limitations provided under section 117 of the bill with respect to sales or exchanges.[8]

The Revenue Act of 1938 used two separate sections to provide constructive sale or exchange treatment for securities becoming worthless during a taxable year. Section 23(g) was enacted to provide this treatment for equity securities and Section 23(k) was enacted to provide this treatment for debt securities. Section 23(g) contained the following wording:

> (g) CAPITAL LOSSES.--
> (1) LIMITATION.--Losses from sales or exchanges of capital assets shall be allowed only to the extent provided in Section 117.
> (2) SECURITIES BECOMING WORTHLESS.--If any securities (as defined in paragraph 3 of this subsection) become worthless during the taxable year and are capital assets, the loss resulting

> therefrom shall, for the purposes of this title, be considered as a loss from the sale or exchange, on the last day of such taxable year, of capital assets.
> (3) DEFINITION OF SECURITIES.--As used in this subsection the term "securities" means (A) shares of stock in a corporation, and (B) rights to subscribe for or to receive such shares.

Section 23(k) contained similar wording but applied to securities defined as

> bonds, debentures, notes, or certificates, or other evidences of indebtedness, issued by any corporation (including those issued by a government or political subdivision thereof), with interest coupons or in registered form.[9]

These two sections were included, unchanged, in the Internal Revenue Code of 1939.[10] Additions to these two Code Sections made by the Internal Revenue Act of 1942 were the last major changes to affect the deductibility of losses from worthless securities. Sections 23(g)(4) and 23(k)(5) allowed corporations to deduct losses from worthless securities of certain affiliated corporations as ordinary losses.[11] The combining of Sections 23(g) and 23(k) to form Code Section 165(g) of the Internal Revenue Code of 1954 resulted in the provision that currently specifies the treatment of losses from worthless securities.

In its current form, Code Section 165(g)(1) allows a taxpayer to treat the loss from a security that becomes worthless on any date during the taxable year as a loss from the sale or exchange of a capital asset on the last day of the taxable year. Exceptions occur in the case of securities that are not held as capital assets or securities that qualify for other than capital asset treatment. In the former category are securities held as inventory by a securities dealer or securities acquired in a transaction without a profit motive.[12] The latter category consists of affiliated bank stock described in Code Section 582(b), securities of subsidiary corporations described in Code Section 165(g)(3), Small Business Investment Company Stock, and Small Business Corporation Stock described in Code Sections 1242, 1243, and 1244.

The securities eligible for loss recognition under Code Section 165(g) are of the following types described in Code Section 165(g)(2)

> (a) A share of stock in a corporation;
> (b) A right to subscribe for, or to receive, a share of stock in a corporation; or
> (c) A bond, debenture, note or certificate or other evidence of indebtedness, issued by a corporation or by a government or a political subdivision thereof, with interest coupons or in registered form.

Since the Code only deals with the treatment of losses from securities that become worthless and specification of securities eligible for this treatment, the Treasury Regulations need to be examined to determine what, if any, conditions must be satisfied to establish that a security is worthless in the claimed year of loss to qualify for loss recognition under Code Section 165(g).

Treasury Regulation Section 1.165-4 which addresses the decline in value of stock provides a partial answer to the question of how to determine when a security becomes worthless by indicating the following conditions that do not indicate worthlessness

> No deduction shall be allowed under Section 165(a) solely on account of a decline in the value of stock owned by the taxpayer when the decline is due to a fluctuation in the market price of the stock or to other similar cause. A mere shrinkage in the value of stock owned by the taxpayer, even though extensive, does not give rise to a deduction under Section 165(a) if the stock has any recognizable value on the date claimed as the date of loss.

Although this Regulation Section specifically refers to Code Section 165(a) it also applies equally to Code Section 165(g) since Code Section 165(a) is the operative provision allowing the deduction of losses in general and Code Section 165(g) refers to a specific type of loss deductible under Code Section 165(a). The guidance provided by this Regulation Section is only conceptual in nature since it fails to specify what is required to demonstrate that recognizable value does or does not exist.

The only other portion of the Regulations directly related to Code Section 165(g) is Section 1.165-5 which specifically addresses worthless securities. This Regulation Section is primarily a restatement of Code Section 165(g) and is totally silent with regard to determining if and when a security becomes worthless. This lack of statutory guidance to determine when the requisite state and date of worthlessness conditions have been satisfied makes it necessary for taxpayers to refer to other authoritative sources for possible answers.

Administrative Interpretations

Pronouncements of the IRS do not carry the same authority as the Internal Revenue Code or Treasury Regulations, but they may be a potential source of guidance for taxpayers since they can communicate conditions the IRS will consider in deciding whether to accept or challenge a taxpayer's position regarding the application of an ambiguous statute. Currently, no IRS Revenue Ruling or IRS Revenue Procedure specifies conditions taxpayers may rely on to determine how the IRS will respond to a claim for loss recognition under Code Section 165(g). In addition to public silence, the IRS has not internally communicated a position on this subject to its own personnel. The IRS Audit Guidelines only mention worthless securities as a potential area for investigation, but do not specify the conditions that may lead to an IRS challenge of a taxpayer's deduction for worthless securities.[13] Also, a search through tax reporting services and LEXIS did not indicate the existence of any General Counsel's Memoranda, Technical Memoranda, or Actions on Decisions expressing an IRS position on Code Section 165(g) issues.

Judicial Decisions

When both statutory and administrative sources fail to adequately define the terms used in the Code, taxpayers and the IRS may arrive at different conclusions regarding the same set of facts and circumstances. These differing conclusions, should they occur, may be resolved through mutual agreement. In the event an agreement cannot be reached, then litigation usually occurs. Because taxpayers have no public access to compromise-type agreements between the IRS and taxpayers, written court opinions involving tax issues constitute the primary source of information taxpayers may use to predict the most likely resolution of a difference with the IRS.

Accurate prediction is often possible when a study of written opinions concerning the application of a specific provision indicates that judges have almost consistently used a single decision process in reaching their conclusions. This potential predictability, of course, rests on the assumption that decision patterns exhibited in the past will continue to be applied in the future. This may not be an unrealistic assumption if judges follow the decision process introduced in a prior case because it represents a comprehensive and sound legal approach to resolving the issue or the decision process is specified in a binding appellate court decision. The results of empirical research by Boyd and Englebrecht and Rolfe support this assumption.[14] Boyd found that lower courts generally followed the Sixth Circuit Court of Appeals' decision in the Mayson Manufacturing Co. case in resolving reasonableness of compensation issues for closely held corporations. Englebrecht and Rolfe found a similar relationship between the Supreme Court's decision in the Davis case and subsequent lower court decisions regarding dividend equivalence in stock redemption cases. However, if such a judicial precedent does not exist with respect to the resolution of an issue, judges are free to adopt any decision process they deem appropriate.

Cases involving loss recognition under Code Section 165(g) fall somewhere between these two extremes, so their analysis may be of some value in assessing potential court behavior. No specific decision rule has been consistently followed by the courts, but a general approach has been used that provides more guidance than is available from either statutory or administrative sources.

In resolving issues that require the determination of worthlessness, the courts have generally held that corporate liabilities must exceed corporate assets and no change in this condition will occur in the foreseeable future.[15] These two conditions have been satisfied when, in the opinion of the court, the taxpayer can demonstrate that the security is worthless in the claimed year of loss and that it had value in the preceding taxable year.[16]

In Morton v. Commissioner, the Board of Tax Appeals discussed its use of an approach to simultaneously establish when the loss of both current and future value occurred.[17] This approach was based on the search for an "identifiable event" having negative financial implications so large that it caused the loss of both current and future value for the stock in question. The following explanation of this approach was provided by the court

> stock may not be considered as worthless even when having no liquidating value if there is a reasonable hope and expectation that it will become valuable at some future time, and that such hope and expectation may be foreclosed by the happening of certain events such as bankruptcy, cessation from doing business, or liquidation of the corporation, or the appointment of a receiver for it. Such events are called identifiable in that they are likely to be immediately known by everyone having an interest by way of stockholding or otherwise in the affairs of the corporation; but regardless of the adjective used to describe them, they are important for tax purposes because they limit or destroy the potential value of the stock.[18]

Since a large number of potential identifiable events and combinations thereof exist, it is possible that, because of differences in individual facts and circumstances among cases, the event(s) that courts regard as being "identifiable" in one case may not be so regarded in other cases. For example, in Foster v. Commissioner, the stock of a bank that became insolvent in 1933, and which did not liquidate until 1934, was found by the court to have become worthless in 1933.[19] However in Nelson v. United States the stock of a corporation that became insolvent in 1931, and continued operations at a minimum level until 1935 when it was forced into liquidation by creditors, was determined to have become worthless in the year of dissolution.[20] While these cases may be distinguished from each other because of continued operations in only one case, they are evidence that one cannot rely on the simple occurrence of an event that has been regarded as "identifiable" in one case to predict the outcome of another case when that same event also occurs.

In addition to dealing with differences in facts and circumstances when determining whether an event is identifiable, the courts have also had to determine which event will be defined as the identifiable event in situations where more than one event has occurred and these events relate to different taxable years. Primarily, this problem involves the relative importance of the opinion and actions of the taxpayer (versus other events). At one extreme is reliance on the subjective opinion and actions of the taxpayer that was taken by the Second Circuit Court of Appeals in Smith v. Helvering.[21] In this case the court held that the stock of a corporation that had ceased to do any significant amount of business, other than to make casual sales on orders received after 1929 (the year when most of its assets were sold), did not become worthless until 1937 when it filed for a certificate of dissolution. The court based its finding of remaining value in the corporation on the fact that the taxpayer continued to advance funds to the corporation which, for the most part, were used to pay corporate obligations the taxpayer had guaranteed. In overturning the decision of the Board of Tax Appeals which found that the stock had become worthless in 1929, this court stated

> The test applied by the Board was stated in the following terms: "The loss must be taken in the year in which it sustained and at no other

> time and this means the year in which these shares in every substantial and realistic way became worthless. We think the decision of the Board too severely restricted the taxpayer and sets too high a standard of industrial performance; especially in the light of the remarkable industrial developments often achieved by courageous and optimistic American businessmen, who refused to be dissuaded when bankers and other conservative citizens advised that their enterprises were worthless in "every substantial and realistic way." Henry Ford is a striking example. Even though, perhaps, a businessman should not be encouraged to be an incurable optimist, if he is one, nevertheless, and continues to express his optimism by putting money into an insolvent organization, he should be given the benefit of the doubt.[22]

In Boehm v. Commissioner the Supreme Court, when confronted with this issue, reached a different conclusion.[23] This court placed much less weight on the opinion and actions of the taxpayer in deciding whether the stock of a corporation that went into receivership in 1932 became worthless during that year, or during 1937 when a suit brought against the officers of the corporation by the taxpayer and other shareholders was settled for a nominal amount. In reaching this conclusion, the court stated

> determination of whether a loss was in fact sustained in a particular year cannot fairly be made by confining the tier of facts to an examination of the taxpayer's beliefs and actions. Such an issue of necessity requires a practical approach, all pertinent facts and circumstances being open to inspection and consideration regardless of their objective or subjective nature. As this Court said in Lucas v. American Code Co., 280 U.S. 445, 449, 50 S. Ct. 202, 203, 74 L. Ed. 538, 67 A.L.R. 1010, "no definite legal test is provided by the statute for the determination of the year in which the loss is to be deducted. The general requirement that losses be deducted in the year in which they are sustained calls for a practical, not a legal, test."

> The standard for determining the year for deduction of a loss is thus a flexible, practical one, varying according to the circumstances of each case. The taxpayer's attitude and conduct are not to be ignored, but to codify them as the decisive factor in every case is to surround the clear language of Section 23(e) and the Treasury interpretations with an atmosphere of unreality and to impose grave obstacles to efficient tax administration.[24]

While the Supreme Court may have resolved the issue of the relative weights attributable to subjective versus objective events, no court has yet developed a scheme to assign relative weights to different objective events that may occur in different taxable years. This lack of guidance to determine which event will be regarded as being "identifiable" results in an environment of uncertainty for taxpayers trying to assess how the courts may resolve a difference with the IRS regarding the worthlessness of a particular stock.

Notes

[1] Tariff Act of October 3, 1913, Section II.G(b), 38 Stat. 114 (1913).

[2] Revenue Act of 1916, Section 5(a) Fifth, 39 Stat. 756 (1916).

[3] Id., Section 5(a) Fourth, and Section 12(a) Second.

[4] Revenue Act of 1918, Section 214(a)(5), 40 Stat. 1057 (1918).

[5] Revenue Act of 1934, Section 23(j), 48 Stat. 680 (1934).

[6] Internal Revenue Bulletin 1939-1 C.B. 571.

[7] Revenue Act of 1936, Section 23(e), 49 Stat. 1648 (1936).

[8] Internal Revenue Bulletin 1939-1 C.B. 741.

[9] Revenue Act of 1938, Sections 23(9) and 23(k)(3), 52 Stat. 447 (1938).

[10] Code Sections 23(g) and 23(k) of the Internal Revenue Code of 1939.

[11] Revenue Act of 1942, Sections 112 and 113, 56 Stat. 798 (1942).

[12] Code Sections 1236 and 165(c).

[13] Internal Revenue Service, Internal Revenue Manual (Chicago: Commerce Clearing House, 1984), pp. 8169-70.

[14] J. Boyd, Validation of Guidelines for Determining Reasonable Compensation in Closely Held Corporations (Ph.D. dissertation, University of South Carolina, 1977); and T.D. Englebrecht and R.J. Rolfe, "An Empirical Inquiry into the Determination of Dividend Equivalence in Stock Redemptions," 4(1) The Journal of the American Taxation Association 19 (1982).

[15] William A. Sipperell, TC Memo 1962-92 (1962), Andrew Popovich, TC Memo 1965-174 (1965), and Norman B. Jacobwitz, TC Memo 1968-261 (1968).

[16] Commissioner v. George Whitney, 169 F.2d 562 (CA-2, 1948), James G. Hoover, 32 TC 618 (1959), and Burt Ruud, TC Memo 1969-252 (1969).

[17] Sterling Morton, 38 BTA 1270 (1938).

[18] Id.

[19] W.N. Foster v. Commissioner, 112 F.2d 109 (CA-1, 1940).

[20] Norman Nelson v. U.S., 131 F.2d 301 (CA-8, 1942).

[21] Herbert W. Smith v. Helvering, 141 F.2d 529 (CA-D.C., 1944).

[22] Id.

[23] Lillian Boehm v. Commissioner, 326 U.S. 287 (1945).

[24] Id.

CHAPTER III

VARIABLE IDENTIFICATION

This chapter identifies the cases and variables selected for analysis in answering Research Question 1. Operational definitions for each variable and the context in which these variables have been discussed in court decisions are presented. Additionally, frequencies of occurrence in Tax Court and Federal district court decisions are presented for those variables found in 10 percent or more of the cases selected for analysis.

Data Base

Preparation of the data base first required the identification of all relevant cases. Case identification was accomplished through a combination of the LEXIS legal research service and manual research techniques. This study only considers decisions from courts of original jurisdiction (Tax Court, Federal district courts, or the U.S. Claims Court) that were not overturned by an appellate decision. Affirming appellate decisions were excluded to prevent double-weighting the same set of variables. Reversed decisions from the court of original jurisdiction were eliminated to exclude nonbinding decisions. Reversing appellate decisions were eliminated since they include a variable not present in decisions from courts of original jurisdiction--specifically, the opinion from the court of original jurisdiction. Appendix A indicates all decisions rendered through December 31, 1983, satisfying the above inclusion criteria. The distribution of these decisions among the various courts is

Court	Number of Decisions
Tax Court	348
Federal district courts	59
U.S. Claims Court	8
Total	415

Research Methodology

In addition to determining the cases that would be analyzed in this study, it was also necessary to decide how these cases would be analyzed. Since one of the research objectives of this study is to determine if differing decision processes are used by the various courts, it was decided that the decisions from each forum would be separately analyzed. Because only 8 of the 415 decisions were made by the U.S. Claims Court, these decisions were eliminated from analysis since it is highly unlikely a statistically valid model could be developed from so few observations.

The identification of variables used by courts in worthless stock decisions was accomplished through a two-step process. First, the following tax literature was reviewed to identify those variables other researchers have regarded as significant in the determination of worthlessness: Commerce Clearing House's Standard Federal Tax Reports,[1] Mertens Law of Federal Income Taxation,[2] Prentice Hall's, Federal Taxes,[3] Research Institute of America's Federal Tax Coordinator 2d,[4] Tax Management Portfolio No. 96 3rd,[5] and an article entitled "Stock Losses: Establishing Worthlessness."[6] Second, actual court decisions were reviewed to determine if the courts considered variables that had not been mentioned in the tax literature.

Since each source had its own unique way of describing variables relevant to the determination of worthlessness, it was necessary to combine variables that were conceptually similar but described differently. This combination process resulted in the development of the following variables and, if applicable, related subcategories:

1. Insolvency.
2. Receivership.
3. Bankruptcy.
4. Foreclosure.
5. Liquidation.
6. Operating Losses.
7. Internal (Corporate and Shareholder) Actions and Testimony:

- a. Continued business operations.
- b. Market conditions for principal product(s).
- c. Value of principal assets.
- d. Renewal or surrender of corporate charter.
- e. Contributions of additional capital.
- f. Proceeds from sales of stock.
- g. Opinions regarding future profitability.
- h. Sale of corporate assets.
- i. Sale of firm.
- j. Willingness to sell shares of stock.
- k. Willingness to sell corporate assets.
- l. Shareholder confidence in management.
- m. Attempts to acquire additional outside capital.

8. External (Third Party) Actions and Testimony:
    - a. Marketability of the corporation's stock.
    - b. Reaction to efforts by the firm to obtain additional capital.
    - c. Reaction to changes in the firm (management, products, or operating procedures).
    - d. Reaction to efforts by the corporation to sell its assets.
    - e. Determinations made by other competent authority (courts or regulatory agencies).
    - f. Opinions of expert witnesses.
    - g. Catastrophic events (destruction of assets, loss of key personnel, or nationalization).
9. Corporate Reorganization.
10. Receipt of Distributions After Claimed Year of Loss.

Selection of Variables for Analysis

Ten general categories of variables were identified in answering Research Question 1. When these variables were expanded to include the variables listed under general variables 7 and 8, a total of twenty-eight variables resulted. Since loss recognition for worthless securities depends not only upon the fact that the security is worthless at the end of the claimed year of loss, but also upon the fact that it became worthless during the claimed year of loss, it is necessary that a temporal dimension be added to each of these variables to include this aspect of the courts' decision-making process. By expanding each variable to include a "prior," "during," and "after" temporal dimension, a total of eighty-four variables resulted.

Since the research techniques used to identify these factors looked at specific cases and references to specific cases, it was possible that some of these variables would only be found in a small number of cases. To avoid analyzing variables having little relationship to a substantial number of cases included in this study, only those variables occurring in ten percent or more of all cases are analyzed. These variables and their respective occurrence rates in each trial court are shown in Table 3.1. The operational definitions used to identify these variables and discussion of how they have been used in court decisions are presented in the pages that follow.

TABLE 3.1

VARIABLE OCCURRENCE RATES

Variable*	Occurrence Rate	
	Tax Court Decisions	District Court Decisions
1P-Insolvency	25%	20%
1Y-Insolvency	36	32
2P-Receivership	19	12
2Y-Receivership	4**	10
4P-Foreclosure	8**	12
5BP-Actual Liquidation	11	17
5BY-Actual Liquidation	33	29
6P-Operating Losses	31	29
6Y-Operating Losses	25	27
7AP-Discontinuation of Business Activity	20	22
7AY-Discontinuation of Business Activity	23	32
7BP-Market for Firm's Principal Products	10	2**
7BY-Market for Firm's Principal Products	10	5**
7FY-Proceeds from Sales of Stock	6**	10
7GY-Opinions Regarding Future Profitability	17	12
8AY-Market for Firm's Stock	6**	12

*P = Occurrence prior to claimed year of loss.
Y = Occurrence during claimed year of loss.

**Occurrence rate does not exceed ten percent cutoff, but is presented for comparison purposes.

Operational Definitions of Variables

Insolvency

Insolvency is included as a variable when (a) it is specifically mentioned in the court opinion or (b) when insolvency is not specifically mentioned by the court but financial statements contained in the opinion indicate total liabilities exceed total assets. Indicating the importance of insolvency, the Tax Court stated in its decision in the Kleberg case regarding whether or not stock held by the taxpayer was worthless in 1934

> The record here reveals that the company was, in reality, insolvent at the close of 1934 and that its stock then had no actual or potential value. We cannot disregard realities. The stock became worthless in 1934.[7]

The values used by the courts to determine insolvency are market values, if such values are in fact available.[8] In the event market values are not available, the courts will consider book values.[9] While insolvency may indicate lack of current value, it does not necessarily indicate worthlessness since it does not establish lack of potential future value. This point was discussed by the court in Olds & Whipple v. Commissioner, which stated

> The fact that the assets were insufficient to meet the operating liabilities may properly be taken as evidence of worthlessness of stock, but it is not conclusive. Actual worthlessness should be the test, and if those in charge of the operations of the corporation, acting in good faith, believe that they might work out of their business conditions wherein losses were sustained, and did

> so, realizing some profit and reducing the deficit, it may not be said that the stock was actually worthless. A real loss is sustained when all changes or possibilities of collection have been effectively destroyed.[10]

Receivership

Receivership is a factor when the court's opinion makes specific reference to (a) receivership, (b) the appointment of a trustee at the direction of another court, or (c) acceptance of a trustee by either shareholders, creditors, or a creditors' committee. In Melick, the Board of Tax Appeals found that the shareholder's stock in a bank, that became insolvent and was placed in receivership during 1921, but which continued to operate until 1923, became worthless during 1921.[11] Even though operations continued, the court found that no profit was being generated and the bank was only concluding prior transactions. Such actions indicated no possibility of recovery from the loss of value incurred by the shareholders during 1921.[12] Similarly, in Schoenhut, the Board of Tax Appeals found that shares of stock in a corporation that became insolvent and was placed in receivership during 1935, but did not have its assets sold by the receiver until 1937, became worthless during 1935.[13] The critical factor in the Board's decision was that the proceeds of the sale in 1937 were not expected to, and did not result in, realization of any proceeds for the shareholders. However, in Lawson, the Board of Tax Appeals also held that shares of stock in a corporation that was placed in receivership during 1932, but reorganized in 1936 with the shareholders of the original corporation receiving equity in the new corporation, were not worthless.[14] These cases indicate receivership will probably be regarded as an event demonstrating the loss of both current and future value if the shareholders do not realize any return on their shares in a subsequent taxable year.

Foreclosure

Foreclosure is considered a factor when the court's opinion (a) specifically mentions foreclosure or (b) refers to creditor suits seeking possession of principal corporate assets. In Ladew, the Board of Tax Appeals indicated the significance of foreclosure in determining whether of not worthlessness had occurred.[15] In part, its discussion provided

> In support of the contention of worthlessness the returns of the corporation were put in evidence, with reliance mainly upon the balance sheets as reported in the returns, reflecting before financial reorganization an enormous operating deficit. The corporation, however, was able to hold off its creditors until some time in 1926; it had behind it the earnest support and backing of the petitioner; and its troubles were largely due to general adverse trade conditions, so that we think it can not be said that prospects were hopeless for a financial rehabilitation.
>
> The regulations of the Commissioner have uniformly required that a loss through worthless stock is only allowable through a closed transaction or where there is a clear showing that the stock is utterly without any value whatever. . . .

> However bad the statement of affairs appears from the balance sheet at the beginning of 1923, it is not a basis upon which we think the respondent, in the face of continued operations, would have permitted the petitioner to have taken, in a prior year, the deduction of loss through worthlessness. . . .
>
> In 1926 the creditors closed down on the corporation and liquidation immediately began . . . there remains a heavy loss, for we see no chance whatever for the petitioner to realize anything on the remainder of his no-par common stock, and we believe there is a satisfactory basis for a conclusion that this no-par stock became worthless in 1926.[16]

Also indicating the relationship of foreclosure to the determination of worthlessness is the decision of the Second Circuit Court of Appeals in Friend.[17] In deciding whether the Board of Tax Appeals was correct in its conclusion that the taxpayer's stock became worthless in 1931 (instead of 1932), as claimed by the taxpayer, this court stated

> Now, in our case, counsel for the petitioners insists that the Board failed to give effect to the value attributable to the stock by reason of the right of redemption. It will be enough to say that the worthlessness of a share of stock as of a particular year is a question of fact, requiring a practical consideration of all the facts and circumstances, . . . and that proof of worthlessness of stock of an insolvent corporation is not dependent upon the completion of liquidation proceedings where the facts clearly indicate a total loss occurred prior thereto. . . . To be sure, foreclosure and sale of the property did not of itself necessarily establish the worthlessness of the stock, but it is a factor to be considered along with the other facts and circumstances in determining whether the stock was worthless in 1931.
>
> The record in this case discloses that the Sheridan Grace Corporation was organized for the specific purpose of building and operating an

> apartment building which was completed too late to obtain satisfactory results for the rental season of 1929; that during the first 14 months of operation the gross income was about $200,000, only slightly in excess of the interest charges on the first mortgage bonds; that only two payments of interest were made on the first mortgage bonds, no payment of the second mortgage bonds being made, and that at the time of the foreclosure sale there were also other judgments and creditor's claims in excess of $50,000.
>
> The Board, after weighing and considering all the evidence presented, found that the evidence did not show that the corporation's equity of redemption had any fair value at any time, or that the shares of stock could have been sold for anything after October 8, 1931, and found as a fact that the corporation was hopelessly insolvent in 1931 and that the loss was sustained in that year.
>
> Under these circumstances we cannot say that there is not substantial evidence to support the Board's finding.[18]

These cases indicate that foreclosure is not sufficient to establish worthlessness unless it is also accompanied by other evidence indicating no remaining value for the corporation's stock.

Actual Liquidation

This variable was included whenever liquidation or dissolution was discussed in the court's opinion. Liquidation following foreclosure was regarded as sufficient evidence by the Board of Tax Appeals to establish worthlessness in Ladew.[19] However, as the Second Circuit Court of Appeals held in Friend, liquidation does not always establish worthlessness.[20] In Conover, taxpayers tried to use corporate dissolution in 1941 to establish worthlessness of stock in a corporation that had most of its assets taken over by creditors in 1937.[21] The Tax Court's opinion indicated

> The burden was therefore upon the petitioners to show that at the end of 1940 the Brookmont stock had value, for the actual dissolution of the corporation in 1941 could not indicate loss of value if none then remained. After careful examination of all of the facts here presented to us, we are forced to the conclusion that the petitioners have not met the burden imposed upon them. It is not without reluctance that we deny deduction for loss in the year when there is final corporate dissolution; yet the circumstances here leave, in our opinion, no alternative.[22]

Also, it is not necessary for liquidation to occur in order for worthlessness to be established. In Jackling, the IRS took this position in an attempt to deny a taxpayer's claim that stock he held through a partnership interest became worthless during 1918 when the corporation abandoned its lumber operations.[23] In deciding this issue, the Board of Tax Appeals stated

> We are of opinion that the partnership, the Pacific Rice Mills, sustained a loss in the fiscal year ended October 31, 1918, in the amount claimed. The evidence shows that it invested in the stock of the corporation the amount of $25,000, and that it advanced the corporation money to continue its business until February 1918, when having determined that the operation of the corporation would always be unprofitable, it caused the corporation to cease its activities and advanced further funds to liquidate the corporation's indebtedness. The advances after February 1918 were made because under the laws of California the partnership, as sole stockholder of the corporation, was liable for its debts. The corporation had no assets other than the timber lease, which under the circumstances was in reality only a continuing liability. The fact that the corporation was not dissolved does not, in our opinion, affect the question presented here.[24]

The implication of these cases is that liquidation, similar to foreclosure, does not establish worthlessness unless accompanied by other events that indicate a total loss of value.

Operating Losses

This variable was included if the court's opinion (a) referred to operating losses, (b) discussed operating deficits, (c) mentioned unsuccessful efforts or operations, or (d) contained financial statements showing losses.

Courts have not found this variable sufficient to establish worthlessness. This point was made by the Board of Tax Appeals in the following discussion from its decision in Burdan when it stated that

> In this proceeding the evidence establishes that, while the Products Corporation was experiencing some financial difficulties during 1933, the extent of which is not fully disclosed, it was a going concern which had sales in excess of $16,000,000 during that year and had assets in excess of $25,000,000 at the close of 1933, valued on a going concern basis. There is no evidence of insolvency of the Products Corporation during 1933 even though it did sustain an operating loss of approximately $602,000 during that year and experienced difficulty in the collection of the subscriptions made under the 1932 plan of reorganization of the Operators Co. During 1933 the Products Corporation collected approximately $180,000 of such subscription and there is no evidence of what portion, if any, of the unpaid subscription, amounting to approximately $719,000, carried as an asset at the end of 1933, was definitely uncollectible. The fact that there had been a shrinkage in the value of the Products Corporation common stock owned by C.C. Burdan and that the conditions existing at the end of 1933 may have been such as to lead him to his

> conclusion that, without a change for the better, he probably would sustain a loss on his investment in such stock, is not sufficient to establish actual worthlessness in that year.[25]

While operating losses do not establish worthlessness in the claimed year of loss, the courts have examined operating losses in determining whether the stock in question became worthless in a prior year. In Olds & Whipple v. Commissioner, the Second Circuit Court of Appeals found that operating losses accompanied by earnest expectations of the taxpayers that economic conditions would improve did not establish worthlessness prior to the claimed year of loss.[26] However, in William C. Squier v. Commissioner, the Second Circuit Court of Appeals reached the following conclusion for stock of a corporation that experienced significant operating losses and operated only through advances of capital from the taxpayer

> We are satisfied that the stock of such a hopelessly insolvent corporation as Shur-Loc Elevator Safety Company, Inc., was worthless during the taxable period. But so far as we can see it was worthless some years before. The record shows an operating loss from the organization of the Shur-Loc Elevator Safety Company, Inc., in 1914 up to November 30, 1926 when it ceased to do business. Prior to January 1, 1926, the loss had already aggregated $322,765.82. The burden was upon the executors to establish that the stock, the cost of which they seek to deduct, became worthless during the taxable year. But it seems quite evident that it was equally worthless the year before and doubtless for several years prior to that.[27]

These cases indicate that continuing operating losses, without evidence that they are expected to be eliminated, may provide the courts with a basis to find that stock became worthless prior to cessation of business activities.

Discontinuation of Business Activities

This variable was included whenever the court's opinion mentioned that a firm's principal line of business was discontinued. The importance attached to this factor by the courts seems to vary with the context of its occurrence. In Jackling, the Board of Tax Appeals found stock in a corporation that abandoned its lumber operations in 1918, but did not formally liquidate, became worthless in the year its operations ceased.[28] However, in Rand, the Board of Tax Appeals found the stock of a corporation that had continued its operations through 1934 to have become worthless prior to 1934.[29] In reaching this conclusion the court stated

> Petitioner urges that at all times the Reorganization Investment Co. continued in the operation of its business and was at all times able to pay its current obligations as they matured. The continued operation of the company does not of itself prove value in its stock. . . . Moreover, the company by its very nature was a liquidating company, and would presumably continue to operate until its purpose was fulfilled, even though the final result of its operations could leave nothing for stockholders.[30]

These decisions indicate that information, in addition to this variable, is used by the courts in reaching decisions regarding worthlessness.

Market for Firm's Principal Products

This variable was included when the court's opinion discussed the absence of a market for the corporation's primary products. The Board of Tax Appeals in Corbett expressed its regard for this variable in reaching the following conclusion

> In 1923 petitioner sold for $10 corporate stock for which he had paid its par value, $18,000, and in 1925 he again sold for $10 stock in the same corporation for which he had paid par, $27,500. The respondent concedes that a deductible loss was sustained by the sale in 1923, but contends that in that year the petitioner determined the stock to be worthless and therefore no loss should be allowed in respect of the sale in 1925.
>
> That conclusion is not justified by the evidence. Although conditions affecting the sheep and wool industries were not good, many of the Basin Wool Co.'s borrowers had shown improvement. The market price of wool had more than doubled and the outlook for the company in 1923 was by no means hopeless. The large loan to R.W. Stanfield gave promise as late as July 1924 of working out successfully. Not until the fall of 1925 was it known that the loan could not be collected. Petitioner testified that in 1923 he did not know the value of the Basin Wool Co.'s stock and that his sale of the stock in that year was purely for the purpose of taking an income tax loss. The fact that he sold the stock for a nominal sum, under the circumstances set forth, does not prove that petitioner had determined the stock to be worthless at the time.[31]

The Board of Tax Appeals in its Pearsall decision also cited market conditions along with other factors, in reaching a conclusion regarding whether stock of the taxpayer became worthless in 1921 when operations ceased or, as claimed by the IRS, during 1922 when the corporation went into receivership.[32] The court stated

> From the foregoing statement of facts it is apparent that the Railway Specialty Co. was insolvent in 1921. At that time it had a deficit of $50,000, with an uncollectible account receivable of about $60,000; it was unable to sell its manufactured product; it could not pay overdue interest on borrowed capital; and its stockholders apparently did not have sufficient confidence in its ability to recover to invest additional money in the enterprise. Additional evidence of the worthlessness of the stock is found in the unsuccessful attempt made by the petitioner to find a purchaser for his holdings at any price. Developments subsequent to 1921 confirmed the opinion.
>
> The stock was worthless at the close of 1921 and the cost thereof was a deductible loss occurring in that year.[33]

From these cases it appears that courts regard marketability of the firm's principal products as an indicator of potential future value for the corporation's stock.

Proceeds from Sales of Stock

This variable was included if the taxpayer had sold any of the stock in question and this sale was contained in the court's opinion. The courts' regard for this variable is mixed. A prime example is the Board of Tax Appeals action in Corbett.[34] Sale of stock for a nominal amount in 1923 was not regarded as a sufficient basis to establish worthlessness in that year; however, a sale of the same stock for a nominal amount in 1925 was associated with worthlessness. The reason for this inconsistent association of nominal selling price with worthlessness is apparently due to other factors the court considered more relevant in determining worthlessness. In this case, the 1923 sale was associated with a firm that was facing improving business conditions, where the 1925 sale was associated with the same firm having no future expectations of recovery.[35] This seems to indicate that while the courts may discuss the sales price of a firm's stock, other variables will be given more weight in determining whether or not the stock is worthless.

Opinions Regarding Future Profitability

This variable was included if the taxpayer or corporate management's opinion regarding the prospects for the future profitability of the firm was contained in the court's opinion. In Olds & Whipple v. Commissioner, the Second Circuit Court of Appeals held that a corporation's stock was not worthless, even though the corporation was insolvent, because the taxpayers continued to operate the corporation under the belief that conditions would improve.[36] Similarly, in Olson, the Tax Court placed a great deal of emphasis on this variable.[37] In this case the following facts and opinion were presented in the court's opinion

> In 1935 petitioner with two others incorporated the Trask-Willamette Co. for the purpose of logging timber partially damaged by fire in a tract in Oregon. . . . The other assets of the corporation consisted of the timber contract permitting the logging of the territory. This contract covered approximately a billion feet of fir timber at a very advantageous price to the

corporation. The early operations of the corporation, however, resulted in a substantial operating deficit prior to 1939. In that year a second fire attacked the lumber tract and destroyed a number of railroad bridges on the only railroad supplying transportation to this tract. In this fire much of the corporation's mortgaged equipment was destroyed. In September 1940 the bank brought foreclosure proceedings, and after the purchase of the equipment by the mortgagee at the foreclosure sale there was a deficiency of approximately $24,000. . . . The resumption of this logging operation would have required additional capital to procure this equipment and either a rebuilding of the railroad or the procurement of trucks and a roadway for the shipment of logs.

At the end of 1940 the only asset retained by Trask-Willamette was the timber contract. During 1941 all prospects of repairing the railroad vanished, the railway equipment was sold, the receiver discharged, and Trask-Willamette rejected the idea of constructing a road to remove the logs by truck. In March of 1941 petitioner disposed of his stock in the corporation to one of his associates in the enterprise for a nominal consideration of $1. He claimed a capital loss in 1941. . . .

The petitioner testified that even after the 1939 fire and the sale of the equipment in 1940 he still thought the lumbering rights of Trask-Willamette were of such a profitable character that he considered the possibility of constructing a road into the site and removing the lumber by truck. The receiver of the railway company meantime was energetically endeavoring to refinance the railroad. He did not give up his efforts and file his final report until August of 1941.

All of the evidence shows that the petitioner was an outstanding man in the lumber business, whose judgment was considered sound by leaders in that field. . . . Should we join with the Commissioner in a hindsight view, it does seem that after the equipment foreclosure sale in 1940 there was not much value left in Trask-Willamette stock. However, due to the advance of war prices in lumber and the advantageous price which Trask-Willamette had on stumpage, our hindsight now tells us that, if petitioner and his associates

> had persisted into the war years, Trask-Willamette would doubtless have been really profitable. In 1940 and 1941 all such questions were conjectures into the future and we would be most reluctant to say that the petitioner was not justified in taking his capital loss in 1941.[38]

These cases show that the courts place considerable emphasis on the beliefs of taxpayers regarding future profitability. Fact situations, which in other cases, have been used as a basis for establish worthlessness, were not found sufficient to establish worthlessness when this variable is present.

Marketability of the Corporation's Stock

If the court's opinion discussed the selling price of corporate stock by any party other than the taxpayer, this variable was included. In George H. Horning a market for the firm's stock was mentioned in the Board of Tax Appeals opinion deciding if the taxpayer's stock became worthless during 1932 when receivers were appointed for the corporation

> Worthlessness of petitioners' stock was not established in 1932 merely because receivers of the Utilities Co. were appointed by a court. The report of the valuation auditor mentioned above shows that as late as 1934 stock of the Utilities Co. was listed on the New York Curb and both its preferred and common stock were then traded in. The stipulation by the parties in this proceeding shows that in 1932 stock quotations on the character of stock owned by these petitioners and here involved indicate that both preferred and common had value--were not absolutely or practically worthless--and were in 1933 also quoted at a lower figure.

> It is true that the plan of reorganization dated September 24, 1934, embodied the statement relied on by petitioners, that the preferred and common stockholders of the Utilities Co. had no equity in its assets, its liabilities to its creditors being in excess of $65,000,000. That situation or condition did not, however, appear to exist in 1932, when the noteholders' committee reported it found much "in the present to suggest an optimistic view of the future."
>
> After carefully considering the entire record, we find no identifiable event which establishes the worthlessness of petitioners' stock in 1932.[39]

However, in John B. Marsh, the Tax Court found quoted market prices were not sufficient to establish that the stock in question was not worthless in the claimed year of loss.[40] The court provided the following discussion of this finding

> The respondent contends that the "over the counter" sales of the preference stock, made within the price ranges per share of a high of 62 cents and a low of 12 1/2 cents in 1932, following the month of May, of a high of 25 cents and a low of 17 1/2 cents, in 1933; of a high of 16 1/2 cents and a low of 10 1/2 cents, in 1934; and of a high of 27 1/2 cents and a low of 11 1/2 cents in 1935, established that the stock continued to have value, not only throughout 1932 but during subsequent years through 1935. Applying the foregoing per share prices to 750 shares of preference stock, the number of shares owned by Isabel S. Marsh, and making allowance for brokerage commission and transfer taxes, the respondent computes maximum and minimum values for the block of stock as follows: $429 and $54 in 1932; $135.75 and $79.50 in 1933; $72 and $27 in 1934; $154.50 and $34.50 in 1935. The record is silent as to the number, frequency, or size of the sales upon which the respondent relies. Whether they were scattered, isolated transactions involving only a few shares each, we do not know. Aside from the showing that they were made "over the counter," nothing is revealed of the circumstances surrounding any of them. In view of this condition of the record and of the public sales made about the end of 1932, the proceeds from which did not meet the expenses thereof, and

> considering the generally recognized insolvent condition of International in 1932, we think that these sales upon which the respondent relies, were of a type that is made for the purpose of establishing losses or represent purchases made by optimists in defiance of reason and the generally known and accepted facts. Transactions of that type do not establish value for stock that is already worthless.[41]

These findings seem to indicate that the courts will only regard a market for the corporation's stock as a factor not indicating worthlessness if the price quoted for the stock is high enough to cover the selling costs of investors holding the stock.

Notes

[1] Commerce Clearing House, Inc., Standard Federal Tax Reports (Chicago: Commerce Clearing House, Inc., 1984).

[2] Callaghan & Co., Mertens Law of Federal Income Taxation (Wilmette, Ill.: Callaghan & Co., 1984).

[3] Prentice Hall, Inc., Federal Taxes (Englewood Cliffs, N.J.: Prentice Hall, Inc., 1984).

[4] Research Institute of America, Inc., Federal Tax Coordinator 2d (New York: Research Institute of America, Inc., 1984).

[5] Tax Management, Inc., Tax Management Portfolio No. 96 3rd [Losses-General Requirements] (Washington, D.C.: Tax Management, Inc., 1984).

[6] J.K. Worthy, "Stock Losses: Establishing Worthlessness," in Proceedings of New York University Twenty-Second Annual Institute on Federal Taxation (New York: Matthew Bender & Co., Inc., 1964).

[7] Alice G.K. Kleberg, 2 TC 1024 (1943).

[8] Blanchard S. Forbes v. Commissioner, 62 F.2d 571 (CA-4, 1933).

[9] B.F. Edwards, 39 BTA 735 (1939).

[10] Olds & Whipple v. Commissioner, 75 F.2d 272 (CA-2, 1935).

[11] J.J. Melick, 6 BTA 70 (1927).

[12] Id.

[13] George W. Schoenhut, 45 BTA 812 (1941).

[14] Edward C. Lawson, 42 BTA 1103 (1940).

[15] J. Harvey Ladew, 22 BTA 443 (1931).

[16] Id.

[17] Milton H. Friend v. Commissioner, 119 F.2d 969 (CA-7, 1941).

[18] Id.

[19] J. Harvey Ladew, 22 BTA 433 (1931).

[20] Milton H. Friend v. Commissioner, 119 F.2d 969 (CA-7, 1941).

[21] Henry S. Conover, 4 TCM 367 (1945).

[22] Id.

[23] D.C. Jackling, 9 BTA 312 (1927).

[24] Id.

[25] John W. Burdan, 37 BTA 642 (1938).

[26] Olds & Whipple v. Commissioner, 75 F.2d 272 (CA-2, 1935).

[27] William C. Squier v. Commissioner, 68 F.2d 25 (CA-2, 1933).

[28] D.C. Jackling, 9 BTA 312 (1927).

[29] Frank C. Rand, 40 BTA 233 (1940).

[30] Id.

[31] Elliott R. Corbett, 28 BTA 46 (1933).

[32] Gilbert H. Pearsall, 10 BTA 467 (1928).

[33] Id.

[34] Elliott R. Corbett, 28 BTA 46 (1933).

[35] Id.

[36] Olds & Whipple v. Commissioner, 75 F.2d 272 (CA-2, 1935).

[37] E.C. Olson, 10 TC 458 (1928).

[38] Id.

[39] George H. Horning, 35 BTA 897 (1937).

[40] John B. Marsh, 38 BTA 878 (1938).

[41] Id.

CHAPTER IV

RESEARCH METHODOLOGY

This chapter primarily discusses the design used to answer Research Questions 2-5. Prior to this discussion, the general methods of analysis are identified and the coding of decisions discussed. Additionally, limitations in the research design are identified.

Method of Analysis

Because of the large number of cases identified for study in this dissertation, traditional legal research may be an impractical method of determining how the variables identified in these cases relate to the decisions of the courts. In addition to possible limitations of human information processing in deriving a relationship among the identified variables for a large set of cases, traditional legal research may be affected by interjection, whether or not intentional, of the researcher's personal biases. This research seeks to avoid both possible limitations by using a more quantitative approach that relies on mathematical and statistical analysis performed with the aid of a computer.

To assess the validity of this assumption that quantitative analysis is superior to traditional legal research when a large number of cases are present, an heuristic model will be developed for comparison purposes in Research Question 3. This assumption would appear justifiable if the classification accuracy of the quantitative model is superior to that of the heuristic model.

Coding Techniques

Two methods of coding the previously identified variables were considered. First, each variable could be represented in terms of three values. For example, insolvency (Variable 1) could be coded as follows: (a) if insolvency was mentioned in favor a finding that a particular stock was worthless, this could be represented by 1; (b) if the corporation was not insolvent and the court mentioned this, -1 would be used; and (c) if solvency or insolvency was not mentioned, this variable would be represented by 0. This model would be expressed as

$$Y = B_0 + B_1X_1 + e,$$

where

Y = the probability of a stock being found worthless,
X = the independent variable,

B = the independent variable coefficient, and

e = the error term.

The expected values for this model are

$$E(Y \mid X_1 = 1) = B_0 + B_1$$

$$E(Y \mid X_1 = -1) = B_0 - B_1, \text{ and}$$

$$E(Y \mid X_1 = 0) = B_0.$$

Second, an alternative approach could be used where each variable could be represented by two dummy variables. Again, using variable 1, insolvency, the following coding scheme would result: (1) if the corporation was insolvent and this fact was discussed by the court, variable X_1 would be coded as a 1 and otherwise a 0 value would be assigned; (2) if the corporation was not insolvent and this fact was discussed by the court, variable X_2 would be coded as a 1 and otherwise a 0 value would be assigned; and (3) if insolvency or solvency were not mentioned by the court, both variables X_1 and X_2 would be coded as 0.

This model would be expressed as

$$Y = B_0 + B_1X_1 + B_2X_2 + e$$

and would have the following expected values

$$E(Y \mid X_1 = 1, X_2 = 0) = B_0 + B_1$$

$$E(Y \mid X_1 = 0, X_2 = 1) = B_0 + B_2, \text{ and}$$

$$E(Y \mid X_1 = 0, X_2 = 0) = B_0.$$

The difference between these two coding methods is not readily apparent until a comparison is made between the values each model assigns to a variable when it is mentioned by the court in worthless and not worthless decisions. Model 1 assigns the same value (B_1) to a single variable (insolvency) in both worthless and not worthless decisions. In contrast, Model 2 assigns unique values (B_1 and B_2) to single variables in worthless and not worthless decisions. This distinction means that Model 2 may utilize more of the information contained in the data than does Model 1. Model 2 does, however, have a limitation in that it doubles the number of variables required for analysis thereby increasing the complexity of the analysis and possibly reducing the statistical significance of findings related to a small population.

The relative benefits of using this coding technique may not be significant. Stewart found that the use of Model 2 only increased the ability to discriminate between employee and independent contractor status by 1.3 percent.[1] For purposes of this research, both coding schemes will be

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used to determine the difference, if any, that the choice between alternative coding techniques may have on the results of this study.

Coding Individual Cases

Each case was examined and the identified variables were coded when they satisfied the operational definitions developed in Research Question 1. Copeland, Taylor, and Brown have noted that observation error in variable coding may adversely affect findings in tax research.[2] To minimize the potential effects of this type of error, operational definitions were provided for each variable prior to coding which used discrete versus continuous values. To determine the potential magnitude of observer error included in the coding of cases for this study, a sample of approximately 10 percent of all cases (40) were independently coded and compared with the original coding. The results of analyzing the comparative codings indicated that 5 of the 3360 identified variables had originally been coded incorrectly. These errors affected different variables providing a basis to conclude that a search for systematic errors in the entire population would likely not produce any significant results. The identified coding errors were corrected but additional possible coding errors were not searched for since the error rate in this sample was less than 1 percent. If this sample is representative of the population, the inclusion of any remaining errors should have an insignificant impact on the results of this study. Support for this assumption can be found in a study by Pollard and Copeland who found that the accuracy of discriminant model predicting the outcome of "tax home" cases was reduced by 2 percent when a 3 percent random coding was introduced into the data used to construct their model.[3] The sensitivity of the models developed in this study, with respect to the introduction of random coding errors will be tested in Research Question 6.

In coding the selected decisions from the Federal district courts and the Tax Court, it was discovered that 20 (5.7%) of the Tax Court cases did not contain any of the variables selected for analysis. These 20 decisions were reviewed to determine whether their elimination from the study would result in a significant loss of data. The only unique feature discovered in the analysis of these cases was a consistent relationship between the presence of Variable 9 (Corporate Reorganization) and the findings of the court in five of the cases. In four decisions where the shareholders received nothing for their prior equity interests, the court found their stock worthless. In a fifth decision where the shareholder received an equity interest in the reorganized corporation, the court found the stock not worthless. These findings imply that while reorganizations may not be a frequent event, what shareholders receive (or do not

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receive) in the reorganized corporation has a consistent relationship to the decisions of the court. In the remaining fifteen decisions no consistent relationship between court decisions and specific variables was discovered.

Research Question 2

Discriminant Analysis

Court decisions regarding worthlessness may result in only one of two possible outcomes: either the stock is worthless or the stock is not worthless. Since these decisions are strictly binary, it is not possible for the court to find a stock anything less than 100 percent worthless. This binary characteristic makes analysis using mathematical models that allow dependent variables to be represented by a continuous range of values (e.g., multiple regression) inappropriate. Multiple Discriminant Analysis (MDA), however, is appropriate for analyzing the relationship between a series of independent variables and a binary dependent variable. This technique searches for two classification functions relating to the binary dependent variable, that will linearly combine the independent variables to give a probability of membership in each group (worthless or not worthless in this study) for each observation. Individual observations will be assigned to the group having the classification function which creates the highest probability of membership score when applied to that observation.

The SPSS-X Discriminant computer software program will be used to derive a discriminant function for those variables occurring in 10 percent or more of the cases selected for analysis.[4] The model developed by this program is of the general form

$$D = d_1X_1 + d_2X_2 + . . . + d_nX_n$$

where

D = the score of the discriminant function,

X_i = the n discriminating variables selected for analysis, and

d_i = the weights for each X variable.

From this discriminant function, classification functions can be derived that will indicate the probability of a particular case belonging to either of these two categories. The classification function for each group could be written as

$$C_i = C_{i1}V_1 + C_{i2}V_2 + . . . + C_{ip}V_p + K_i$$

where

C_i = the classification score of the ith group,

C_{ij} = the classification coefficients,

K_i = the constant, and

V_i = the observations from the individual cases.

This function may be used to calculate a classification score for each decision for both groups (worthless versus not worthless). A decision will be assigned to the group for which it has the highest classification score. Finally, it is possible to convert the classification scores to probabilities of group membership. The classification of a case into a particular group is, in fact, the same as attributing the decision to the group for which it has the greatest probability of membership.[5]

If classification functions are used to predict the group membership of the same cases that were used to develop the classification functions themselves, an upward bias in the classification accuracy of the model may occur. Two procedures will be used to help overcome this potential bias.

First, for the 328 Tax Court decisions, the Statistical Analysis System (SAS) computer program DISCRIM will be used to derive a discriminant function for the selected variables from approximately one-half of the decisions that will be selected at random.[6] This discriminant function will then be used to classify a holdout sample of remaining decisions. The selection of the holdout sample will be accomplished by assigning a normally distributed random variable having a range of 0 to 1 to each decision. If the value of the variable is less than .5, the case will be assigned to the

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group used to develop the discriminant function. Otherwise, the case will be assigned to the holdout sample. Second, the classification accuracy of the model developed for Federal district court decisions will be examined using a different technique. Since there are only 59 decisions, statistically meaningful results may not be obtained by using the holout sample method as was possible with the 328 Tax Court decisions. An alternate validation procedure from the P7M computer program of the Biomedical Computer Program P Series (BMDP) that is more statistically appropriate will be used instead.[7] This technique is known as the "jack-knife validation procedure" that was initially proposed by Lachenbruch.[8] This procedure involves calculating a discriminant function based on all but one decision. This discriminant function is then used to develop classification functions to classify the omitted decision as worthless or not worthless. This technique is then repeated leaving out a different decision each time until all decisions have been classified. To determine how well this technique compares to the use of a holdout sample, it will also be used on the 328 Tax Court decisions and the respective results will be examined.

Statistical Considerations of MDA

The use of MDA is based on statistical assumptions that the independent variables have a multivariate normal distribution, the dispersion matrices within each group are identical, and that the selected variables contain the actual parameters used by judges in reaching their decisions.

Since the coding scheme used in this research assigns only one of three values to each independent variable, the first condition is violated. Two studies have indicated that a linear discriminant function is sufficiently robust to perform well in spite of violating the multivariate normal assumption.[9]

To determine whether the equal dispersion assumption is satisfied, the SAS DISCRIM Procedure POOL = TEST option will be used. If the within group covariance matrices are equal, a pooled covariance matrix will be used.

When the equal dispersion assumption is violated, the use of a quadratic estimation procedure is considered appropriate.[10] Even though the quadratic estimation technique is theoretically preferred when within group covariance matrices differ, Gilbert has demonstrated that use of a linear model produces similar results.[11] In some cases, Gilbert even found the linear method superior to the quadratic. Because these findings suggest that results obtained by using either method may not significantly differ, only linear classification functions will be used since the SAS DISCRIM and SPSS-X Discriminant programs have no options for quadratic functions.

Eisenbeis has made the following observation regarding the use of pooled versus individual covariance matrices to construct a linear model from a small but fixed sample

> When the dispersions are similar, this leads to relatively more efficient linear classification results which are not swamped by the effects of averaging the group dispersions. However as the differences in the dispersion increase, the efficiency of the linear parameter estimates begin to become dominated by the effects of the unequal dispersions.[12]

Since Eisenbeis does not specify how a large sample may be distinguished from a small sample, it is possible that matrix choice may affect the findings of this research. To test for this potential effect, the accuracy of classification functions based on a linear discriminant function derived from individual versus pooled covariance matrices will be compared.

A discriminant function that is solely based on an analysis of the relationship between individual and dependent variables may fail to accurately classify observations unless additional parameters are considered. Lachenbruch specifically recommends the consideration of the cost of misclassifying observations and the _a priori_ probability of group membership.[13]

Consideration of group misclassification costs is relevant only when the costs of misclassifying observations between groups are significantly different. Since Tax Court decisions are subject to possible review by an appellate court, it is assumed that judges consider the possibility that their findings may be reversed as the only cost of misclassification. If judges only regard misclassification costs in terms of accuracy, it is not necessary to include this parameter in the discriminant function that will be developed since these costs are equal.

Eisenbeis has found that misclassification rates increase when differences in a priori probabilities of group membership are not considered.[14] Even though prior probabilities for the decisions examined in this study are approximately proportional (.49 worthless and .51 not worthless for Tax Court decisions and .58 worthless and .42 not worthless for Federal district court decisions) the effect of differences will be considered. By entering the respective probabilities of group membership into the prior probability options of the selected computer software packages resulting discriminant functions will be adjusted for differences in prior probabilities.

Correct Functional Form

The use of linear discriminant analysis assumes no interaction exists among the independent variables. This assumption may not hold if judges regard the presence of a particular variable such a strong indicator of worthlessness that other variables, also present in that specific case, have little influence on their decision. For example, if a corporation was hopelessly insolvent, it may not matter that bankruptcy had not been declared or that the corporation had not been liquidated for a judge to find the corporation's stock worthless. If judges allow independent variables to interact in this manner, uniform increases in the importance a judge places on an independent variable would not be accompanied by uniform increases in the probability of a particular outcome as is assumed in a linear model. Instead, this interaction may be more accurately described by a non-linear, tilted S-shape curve, relationship where an independent variable has its greatest impact on changing the probability of a particular finding at the midpoint of this distribution. Since this distribution is steepest at its midpoint and relatively flat at either tail, changes in the importance associated with an independent variable occurring near either endpoint would have little effect on the judge's finding.

To determine whether a non-linear model better describes the decision process of the Tax Court, the classification accuracy of a non-linear model will be compared against the classification accuracy of the linear discriminant function. The non-linear model will be estimated through a "logit transformation" of the dependent variables. This technique produces an S-shape distribution within the limit of the (0,1) bounds imposed by the presence of binary dependent variables. Stewart has noted that logit transformation is unique among most common non-linear estimation procedures because of its ability to convert dichotomous dependent variables into continuous variables with (0,1) bounds. A similar non-linear model, probit analysis, was considered, but not adopted because it assumes normal distribution of its explanatory variables, which is not the case in logit analysis.

Logit transformation is based on the cumulative logistic probability function

$$P_i = F(XB) = \frac{1}{1 + e - (XB)}$$

where

P_i = the probability a judge will find a stock worthless, given the knowledge of X;

X = the independent variable(s);

B = the coefficients of the independent variables; and

e = the base of the natural logarithms (approximately 2.718).

This equation can be solved in terms of e^{XB}, giving

$$e^{XB} = \frac{P_i}{1 - P_i}$$

where

$1 - P_i$ = the probability a judge will find a stock not worthless, given the knowledge of X.

By taking the log of both sides, the equation is expressed in terms of the independent variables and their respective coefficients (XB)

$$XB = \log \frac{P_i}{1 - P_i}.$$

Once the parameters of this model have been estimated, the arithmetic process above may be reversed and applied to individual cases to determine classification accuracy. The SAS LOGIST program will be used to determine how accurately individual decisions are predicted for both Tax Court and Federal district court cases.[15]

Research Question 3

Construction of the heuristic model requires a synthesis of statutory requirements, the "identifiable event" criteria adopted by the courts, and the variables selected for analysis. Generally, a finding of worthlessness depends on the ability of the identified variables to indicate that the stock in question lost both current and future value during the claimed year of loss. A single variable indicating either form of value may result in disallowance of the loss deduction.

For this reason, the heuristic model is based on values that may be assigned to the identified variables that may lead to a not worthless finding by the courts and the temporal distribution (year of occurrence) of all other variables. If a case contains any one of the identified variables coded in the manner listed below, the finding will be predicted to be not worthless. Otherwise, a worthless decision will be predicted.

Variable	Coded Value	Interpretation
Insolvency (Y)	-1	Lack of insolvency in claimed year of loss
Actual Liquidation (P)	+1	Liquidation prior to claimed year of loss
Operating Losses (Y)	-1	Operating profits in claimed year of loss
Continuity of Operations (Y)	-1	Operations continued throughout claimed year of loss

If a decision did not contain any of the variables listed above, the temporal distribution of the variables that were present formed a basis for classifying the stock as either worthless or not worthless. If more variables were attributable to events or conditions occurring either before or after the claimed year of loss, the stock was predicted to be not worthless. Otherwise a finding of worthless was predicted.

The accuracy of this model will be compared with that of the "best" model developed in answering Research Question 2. The basis for this comparison will be the classification accuracy of each model.

Research Question 4

Since the cases identified for examination in this research span a 62-year period, it is possible that the decision model used by the courts has changed during this period. If the model has changed, a discriminant function based on all cases would not be as accurate as functions based solely on pre- and post-change cases. Because of the relatively small number of decisions from the federal district courts, only the decisions of the Tax Court will be examined for temporal stability. To determine whether a change in the Tax Court model has occurred, a discriminant function from the first one-half of the 328 cases decided during the 62-year time period (pre-1941) will be calculated. This model will then be used to develop a classification function that will be applied to cases decided after 1940. If the percentage of post-1940 cases that are misclassified by the 62-year classification function and the pre-1941 classification function are not significantly different, temporal stability of the Courts' decision model may be inferred.

Similarly, the current validity of the Tax Court model will be assessed by using the first 90 percent of all decisions (pre-1968) to classify the most recent 10 percent (post-1967). If the classification accuracy for the most recent 10 percent is not significantly different from that of the earlier 90 percent current validity of the model may be inferred.

Research Question 5

To determine whether the choice of forum has an effect on classifying a stock as worthless or not worthless, separate discriminant functions will be developed for all

Tax Court and all federal district court decisions, respectively. These discriminant functions will then be used to classify the decisions from the other court. If the classification accuracy for the decisions decided by the other court does not significantly differ from the classification accuracy for the decisions from the court that were used to develop the discriminant function, it is possible to infer that decision making is consistent across these two courts.

Research Question 6

The sensitivity of the models to random error will be assessed by changing the initial coding of the variables and comparing the models based on the modified data with the models based on the original data. Changes in the coding of variables will be made randomly in the manner suggested by Pollard and Copeland as follows[16]

If the original code is	and the random number is	then change the original code to
0	0-4	1
0	5-9	-1
1	0-4	-1
1	5-9	0
-1	0-4	0
-1	5-9	1

A 3 percent error rate for Tax Court cases involves changing 118 variables ([328 cases x 12 variable] x .03). For the Federal district court cases, 25 variables will be changed ([59 cases x 14] variables x .03). The 10 percent error rate required changes to 394 and 83 variables, respectively. The modified data will be used to develop discriminant functions that will be compared with the models developed from the original data. Differences in the weighting of individual variables or the overall classification accuracy of the models will provide a basis for determining whether the models are sensitive to the introduction of random coding errors.

A similar analysis will be performed to determine the sensitivity of the models to the introduction of systematic error. Systematic error will be introduced in the two variables having the greatest contribution to the original models. For the Tax Court model, these variables are 1Y (Insolvency in the Claimed Year of Loss) and 1P (Insolvency Prior to the Claimed Year of Loss). For the Federal district court model, the variables that will be changed are 1Y (Insolvency in the Claimed Year of Loss) and 5P (Liquidation Prior to Claimed Year of Loss). Systematic error will be individually introduced by the following transformation of coded values

If the original coding is	then the coding is changed to
0	1
0	-1
1	0
1	-1
-1	0
-1	1

Limitations

The findings of this research may be affected by more than uncertainty regarding the appropriateness of various statistical and mathematical assumptions that have been made. Several conditions may result in differences between the factors actually considered by judges and the factors this research has associated with their decisions.

First, in tax litigation the burden of proof is placed on the taxpayer to demonstrate the IRS's position is invalid.[17] For this reason, judges are precluded from considering any relevant information they may be aware of which has not mentioned by the taxpayer. Second, judges' written opinions may not include all variables presented for consideration since these opinions are not a verbatim record of trial. If a judge includes discussion of enough significant variables to justify his finding to a possible appellate review, he may not feel that discussing, what he considers insignificant factors, is necessary. Third, it is possible for individual biases of the researcher to result in the miscoding of some variables. This limitation should only be minimal based on the low error rate found in the 40 cases that were independently coded.

Notes

[1] D.N. Stewart, Employee or Independent Contractor: An Examination of the Relevant Variables Employed by the Federal Courts in Deciding the Question (Ph.D. dissertation, University of Florida, 1980).

[2] R.M. Copeland, R.L. Taylor, and S.H. Brown, "Observation Error and Bias in Accounting Research," 19(1) Journal of Accounting Research 197 (1981).

[3] W.B. Pollard and R.M. Copeland, "Evaluating the Robustness of Multivariate Tax Models: A Section 162(a)(2) Model" (Unpublished manuscript, 1984).

[4] SPSS, Inc., SPSS-X User's Guide (New York: McGraw-Hill, 1983).

[5] N. Nie, Statistical Package for the Social Sciences (New York: McGraw-Hill, 2d ed., 1975).

[6] SAS Institute, Inc., SAS User's Guide--1979 Edition (Cary, N.C.: SAS Institute, Inc., 1979).

[7] W. Dixon and M. Brown, BMDP Biomedical Computer Programs P-Series--1979 (Berkeley: University of California Press, 1981).

[8] P.A. Lachenbruch, "On Expected Probabilities of Misclassification in Discriminant Analysis, Necessary Sample Size and a Relation with the Multiple Correlation Coefficient," 24 Biometrics 823 (1968).

[9] E.S. Gilbert, "On Discrimination Using Qualitative Variables," 63 Journal of the American Statistical Association 1399 (1968); and W.J. Krzanowski, "Discrimination Using Both Binary and Continuous Variables," 70 Journal of the American Statistical Association 782 (1968).

[10] E.S. Gilbert, "The Effect of Unequal Variance-Covariance Matrices on Fisher's Linear Discriminant Function," 25 Biometrics 505 (1969).

[11] Id. at 512.

[12] R.A. Eisenbeis, "Pitfalls in the Application of Discriminant Analysis in Business, Finance, and Economics," 32 Journal of Finance 879 (1977).

[13] P.A. Lachenbruch, "Discriminant Analysis," 35 Biometrics 69 (1979).

[14] R.A. Eisenbeis, supra note 12, at 889.

[15] SAS Institute, Inc., SAS Supplemental Library User's Guide--1980 Edition (Cary, N.C.: SAS Institute, Inc., 1980).

[16] W.B. Pollard and R.M. Copeland, supra note 3, p. 7.

[17] Code Section 7453 and Tax Court Rule of Practice 32.

CHAPTER V

EMPIRICAL RESULTS

This chapter contains the empirical results obtained in answering Research Questions 2 through 6. Questions 2 through 4 are separately answered for decisions from the Tax Court and Federal district courts. In the results for Question 5, differences attributable to the court of original jurisdiction are analyzed. Research Question 6 examines the sensitivity of the models developed in this study to the introduction of both random and systematic coding errors. The results of this study are then compared with related research.

Research Question 2

Discriminant Analysis

Model construction. In Chapter III, 12 variables from Tax Court decisions and 14 variables from Federal district court decisions occurring in 10 percent or more of the respective cases were selected for analysis. As discussed in Chapter IV discriminant analysis is based on the assumptions that each group is derived from a set of independent variables that possess a multivariate normal distribution and that the covariance matrices for each group are equal. Since each variable is assigned one of three values in the primary coding technique and only one of two values in the alternate coding technique, the multivariate normal distribution assumption is violated. Studies by Gilbert and Krzanowski have shown that linear discriminant functions are sufficiently robust to perform well in spite of violating this assumption.[1] To test for equality of the covariance matrices the POOL = TEST option of the SAS DISCRIM program was applied. For the Tax Court model the Chi-Square value of the test statistic was 224.61 with 78 degrees of freedom which is significant at the 0.0001 level. The Chi-Square value for the Federal district court model was 181.93 with 105 degrees of freedom which is also significant at the 0.0001 level. These values indicate the group covariance matrices do not satisfy the equality assumption of discriminant analysis. Even though the use of within group covariance matrices is more appropriate, the use of pooled covariance matrices was selected since only the SAS DISCRIM program provides the option to develop a model based on within group covariance matrices and this option only provides the classification accuracy of the model without any coefficients or interpretive statistics. The following section quantifies the difference in classification accuracy between models using a pooled covariance matrix versus within group covariance matrices.

Classification accuracy. Tables 5.1 and 5.2 present the classification accuracy of models based on within group

TABLE 5.1

WITHIN GROUP COVARIANCE MATRICES MODEL CLASSIFICATION ACCURACY

Actual Group	Percent Correct	Predicted Worthless	Not Worthless
		Tax Court Model	
Worthless	85.5	136	23
Not Worthless	69.8	51	118
Total	77.4	187	151
		Federal District Court Model	
Worthless	94.1	32	2
Not Worthless	100.0	0	25
Total	96.6	32	27

TABLE 5.2

POOLED COVARIANCE MATRIX MODEL CLASSIFICATION ACCURACY

Actual Group	Percent Correct	Predicted: Worthless	Predicted: Not Worthless
Tax Court Model			
Worthless	79.2	126	33
Not Worthless	81.7	31	138
Total	80.5	157	171
Federal District Court Model			
Worthless	91.2	31	3
Not Worthless	92.0	2	23
Total	91.5	33	26

covariance matrices and pooled covariance matrices. Using a pooled covariance matrix resulted in a 3.1 percent change in the classification accuracy of the Tax Court model and a 5.1 percent change in the classification accuracy of the Federal district court model. These differences are the result of changes in the cases that were misclassified by each model. For the Tax Court models, 27 decisions that were misclassified by the within group covariance matrices models and 17 decisions that were misclassified by the pooled covariance matrix model were correctly classified by the other model. For the Federal district court model, 1 decision that was misclassified by the within group covariance matrices model was correctly classified by the pooled covariance matrix model and 4 decisions that were misclassified by the pooled covariance matrix model were correctly classified by the within group covariance matrices model. The original distribution of posterior probabilities for the 49 decisions that were reclassified is

Original Posterior Probability of Group Membership	Number	Percent
.50-.59	14	28.6
.60-.69	16	30.6
.70-.79	11	22.4
.80-.89	2	8.2
.90-1.00	6	12.2

The above indicates that selecting pooled versus within group covariance matrices models in this study has resulted in a change in the classification for those decisions with a posterior probability of group membership closest to .5, but has not significantly changed the overall classification of all decisions.

Table 5.3 presents the pooled covariance matrix models for Tax Court and Federal district court decisions showing the standardized discriminant function coefficients, Wilks' Lambda statistic, and F-Ratio for each variable. The standardized coefficients, when applied to the data also converted to a standard form, will result in a discriminant score that will have a zero mean and a standard deviation of one. This allows one to interpret the standardized coefficients (when the sign is ignored) as the relative contribution of each variable to the function. This interpretation is analogous to the interpretation of beta weights in multiple regression.[2] The interpretation of Wilks' Lambda and the F-Ratio are inverse. The Wilks' Lambda value indicates the discrimination between groups that is not explained by a particular variable or the entire model. The F-Ratio indicates the ability of a particular variable to discriminate between the groups.[3] Accordingly, a low Wilks' Lambda value and high F-Ratio will be associated with the most significant variables. The overall Wilks' Lambda values are 0.6651 for the Tax Court model and 0.3740 for the Federal district court model.

The variables that are significant at the .05 level and the relative rank of their coefficients in the discriminant functions for the Tax Court and Federal district court models are

TABLE 5.3

POOLED COVARIANCE MATRIX DISCRIMINANT MODELS

Variable	Standardized Coefficient	Wilks' Lambda	F-Ratio	Significance
	Tax Court Model			
1P-Insolvency(P)	-0.5670	0.9120	31.47	0.0000
1Y-Insolvency(Y)	0.5553	0.9070	33.44	0.0000
2P-Receivership(P)	-0.2084	0.9679	10.81	0.0011
5P-Liquidation(P)	-0.0929	0.9408	20.50	0.0000
5Y-Liquidation(Y)	0.4453	0.9306	24.31	0.0000
6P-Operating Losses(P)	-0.2551	0.9925	3.46	0.1177
6Y-Operating Losses(Y)	0.0819	0.9966	1.10	0.2950
7AP-Discontinued Operations(P)	-0.2547	0.9627	12.63	0.0004
7AY-Discontinued Operations(Y)	0.3666	0.9381	21.51	0.0000
7BP-Market for Principal Product(P)	0.0295	0.9999	0.03	0.8561
7BY-Market for Principal Product(Y)	-0.0507	1.000	0.00	0.9827
7GY-Opinion Regarding Future Profitability(Y)	0.0489	0.9993	0.25	0.6206

TABLE 5.3

CONTINUED

Variable	Standardized Coefficient	Wilks' Lambda	F-Ratio	Significance
Federal District Court Model				
1P-Insolvency(P)	-0.5263	0.8887	7.14	0.0098
1Y-Insolvency(Y)	0.7289	0.6886	25.78	0.0000
2P-Receivership(P)	0.2521	0.9999	0.01	0.9784
2Y-Receivership(Y)	-0.0437	0.9694	1.80	0.1849
4P-Bankruptcy(P)	-0.0337	0.9880	0.69	0.4083
5P-Liquidation(P)	-0.5691	0.8104	13.33	0.0000
5Y-Liquidation(Y)	0.2151	0.9002	6.32	0.0148
6P-Operating Losses(P)	0.0712	0.9722	1.63	0.2065
6Y-Operating Losses(Y)	-0.0841	0.9812	1.10	0.2997
7AP-Discontinued Operations(P)	0.0137	0.9575	2.53	0.1172
7AY-Discontinued Operations(Y)	0.5132	0.7850	15.61	0.0002
7FY-Proceeds from Sales of Stock(Y)	0.3365	0.9998	0.01	0.9125
7GY-Opinion Regarding Future Profitability(Y)	-0.0731	0.9918	0.47	0.4952
8AY-Market for Firm's Stock(Y)	-0.1970	0.9999	0.01	0.9270

Tax Court Model

Variable No.	Variable	Rank
1P	Insolvency(P)	1
1Y	Insolvency(Y)	2
2P	Receivership(P)	6
5P	Liquidation(P)	7
5Y	Liquidation(Y)	3
7AP	Discontinued Operations(P)	5
7AY	Discontinued Operations(Y)	4

Federal District Court Model

Variable No.	Variable	Rank
1P	Insolvency(P)	3
1Y	Insolvency(Y)	1
5P	Liquidation(P)	2
5Y	Liquidation(Y)	4
7AY	Discontinued Operations(P)	5

indicating that these variables have the greatest ability to predict past decisions of the courts. An examination of misclassified cases revealed that 11 out of 79 of the misclassified Tax Court decisions were cases in which the court's decisions were consistent with the context of its discussion of Variable 9 (Corporate Reorganization). When equity of the shareholder was recognized in the reorganized corporation, the stock was found to have value and when the shareholder's equity was not recognized in the reorganized firm, the stock was found to be worthless. Similarly, 10 out of 79 of the misclassified Tax Court decisions were consistent with the court's discussion of Variable 10 (Receipt of Distributions After Claimed Year of Loss). The consistent relationship between the context of variables indicating receipt of value after the claimed year of loss and the court's decisions indicates that even though these variables have not been included in the Tax Court model (because of a lack of observations), they are of considerable importance in predicting selected Tax Court decisions. No relationship between single variables and misclassified decisions was found for the Federal district court decisions.

To determine whether the discriminant functions classify cases better than would pure random selection, a measure suggested by Klecka was used.[4] This statistic, Tau, is calculated as follows

$$\text{Tau} = \frac{n_c - \sum_{i=1}^{g} p_i n_i}{n_. - \sum_{i=1}^{g} p_i n_i}$$

where

n_c = number of correctly classified decisions,

$n_.$ = total number of decisions,

n_i = number of decisions in group i,

g = number of groups,

p = probability of membership in group i, and

i = each group.

For the Tax Court model, Tau has a value of 60.9 percent and for the Federal district court model the value of Tau is 79.2 percent. These values represent the reduction in classification errors attributable to using discriminant analysis versus random assignment based on prior probabilities of group membership.

Since model classification accuracy is based on the same cases used to derive the models, it is possible the classification accuracy of these models may contain an upward bias.[5] To determine the effect of this potential bias, the classification accuracy of the Tax Court model was tested by the use of a holdout sample. However, because of the relatively small number of Federal district court cases, the accuracy of the Federal district court model had to be tested through the Lachenbruch jackknife procedure. For comparison purposes, the Lachenbruch jackknife validation procedure was also used for the Tax Court model. A Tax Court model derived from 164 randomly selected cases having a 79.9 percent classification was able to correctly classify 75.0 percent of the decisions not used in constructing this model. This indicates the 80.5 percent classification accuracy of the Tax Court model may contain a small amount of upward bias. When the Lachenbruch jackknife validation procedure was used, a classification accuracy percentage of 79.0 percent for the classified observations also indicated the classification accuracy percentage of the Tax Court model may contain some upward bias that may not be eliminated by this procedure. For the Federal district court model, the jackknife validation procedure correctly classified 86.4 percent of the decisions, indicating possible upward bias in the 91.5 percent classification accuracy of the original model. Interpretation of the differences between the classification accuracies of the original models and the jackknife classification procedure is limited by the fact that this BMDP program uses a stepwise procedure to develop its discriminant models. The variables selected by the stepwise procedure resulted in discriminant functions based on the following variables

Tax Court Model	Federal District Court Model
Insolvency(P)	Insolvency(P)
Insolvency(Y)	Insolvency(Y)
Receivership(P)	Receivership(P)
Liquidation(Y)	Liquidation(P)
Operating Losses(P)	Discontinued Operations(Y)
Discontinued Operations(P)	
Discontinued Operations(Y)	

The models developed from these reduced sets of variables resulted in a classification accuracy of 79.9 percent for the 328 decisions in the Tax Court model and 89.9 percent for the 59 decisions in the Federal district court model. The ability of the stepwise models to achieve a classification accuracy within 2 percent of the all-variable models (.6% for the Tax Court and 1.6% for the Federal district court) indicates that the variables not used in the stepwise models have very little effect on the ability of the models to classify decisions. The use of stepwise models in this research was not considered appropriate for two reasons. First, it is possible that models may be developed that contain variables which occur in an insignificant number of court decisions. Second, it is possible that models using reduced sets of variables may not accurately predict different decisions that have a zero value coded for the variables included in the reduced model. In fact, the BMDP stepwise procedure resulted in the classification of 6 Tax Court and 15 Federal district court decisions having a zero value coded for each discriminating variable included in the models.

Alternative coding. In Chapter IV an alternative coding procedure that converts each variable originally coded with one of three possible values into two dummy variables with two possible values each was suggested to use more of the information contained in the data. The effects of using this alternative coding scheme are presented in Tables 5.4 and 5.5 which indicate standardized coefficients, Wilks' Lambda, and F-Ratio values for each of the dummy variables. A (D) following the name of a variable indicates that it was mentioned by the court as a factor that did not indicate worthlessness and corresponds to a value of -1 being assigned to the original variable. Otherwise the dummy variable corresponded to an original coding value indicating the court considered the variable as an indicator of worthlessness.

In Table 5.6 the classification accuracies for the alternative coding models are presented. The classification accuracy of the Tax Court model improved by .9 percent (81.4 percent versus 80.5 percent for the original model) and the classification accuracy of the Federal district court model decreased by 1.6 percent (89.9 percent versus 91.5 percent for the original model). These small differences indicate that using the alternative coding scheme has little effect on the ability of the models to correctly predict decisions.

TABLE 5.4

TAX COURT ALTERNATE CODING MODEL

Variable	Standard Coefficient	Wilks' Lambda	F-Ratio	Significance
1P-Insolvency(P)	-0.5827	0.9120	31.47	0.0000
1Y-Insolvency(Y)	0.5147	0.9070	33.44	0.0000
2P-Receivership(P)	-0.2343	0.9679	10.81	0.0011
5P-Liquidation(P)	-0.0765	0.9408	20.50	0.0000
5Y-Liquidation(Y)	0.4656	0.9306	24.31	0.0000
6P-Operating Losses(P)	-0.1257	0.9925	2.46	0.1177
6Y-Operating Losses(Y)	0.0127	0.9966	1.10	0.2950
7AP-Discontinued Operations(P)	-0.3236	0.9627	12.63	0.0004
7AY-Discontinued Operations(Y)	0.2287	0.9381	21.51	0.0000
7BP-Market for Principal Products(P)	0.0383	0.9999	0.03	0.8561
7BY-Market for Principal Products(Y)	-0.0296	1.0000	0.00	0.9827
7GY-Opinion Regarding Future Profitability(Y)	0.0425	0.9992	0.25	0.6206
1PD-Insolvency(P)	-0.0342	0.9918	2.69	0.1022
1YD-Insolvency(Y)	-0.0046	0.9809	6.34	0.0123
2PD-Receivership(P)	-0.1344	0.9971	0.94	0.3328
5PD-Liquidation(P)	Is a constant (no non-zero observations)			
5YD-Liquidation(Y)	0.1873	0.9988	0.40	0.5280
6YD-Operating Losses(P)	0.1892	0.9909	2.98	0.0851
6YD-Operating Losses(Y)	-0.1428	0.9942	1.89	0.1699
7APD-Discontinued Operations(P)	-0.1717	0.9942	1.89	0.1699
7YAD-Discontinued Operations(Y)	-0.1184	0.9840	5.31	0.0219
7BPD-Market for Principal Products(P)	0.1107	0.9968	1.06	0.3033
7YBD-Market for Principal Products(Y)[a]		0.9968	1.06	0.3033
7YGD-Opinion Regarding Future Profitability(Y)	-0.1250	0.9884	3.83	0.0512

[a] Deleted from model because variable failed tolerance test.

TABLE 5.5

FEDERAL DISTRICT COURT ALTERNATIVE CODING MODEL

Variable	Standard Coefficient	Wilks' Lambda	F-Ratio	Significance
1P-Insolvency(P)	-0.5375	0.8887	7.14	0.0098
1Y-Insolvency(Y)	0.6551	0.6886	25.78	0.0000
2P-Receivership(P)	0.2300	0.9999	0.01	0.9784
2Y-Receivership(Y)	0.0665	0.9694	1.80	0.1849
4P-Bankruptcy(P)	-0.1027	0.9880	0.69	0.4083
5P-Liquidation(P)	-0.5825	0.8104	13.33	0.0006
5Y-Liquidation(Y)	0.3344	0.9002	6.32	0.0148
6P-Operating Losses(P)	0.0633	0.9722	1.63	0.2065
6Y-Operating Losses(Y)	-0.0439	0.9812	1.10	0.2997
7AP-Discontinued Operations(P)	-0.1068	0.9575	2.53	0.1172
7AY-Discontinued Operations(Y)	0.3123	0.7850	15.61	0.0002
7FY-Proceeds from Sale of Stock(Y)	0.2721	0.9998	0.01	0.9125
7GY-Opinions Regarding Future Profitability(Y)	-0.0173	0.9918	0.47	0.9270
8AY-Market for Firm's Stock(Y)	-0.3084	0.9999	0.01	0.4952
1PD-Insolvency(P)[a]				
1YD-Insolvency(Y)	-0.2100	0.9271	4.48	0.0387
2PD-Receivership(P)[a]				
2YD-Receivership(Y)[a]				
4PD-Bankruptcy(P)[a]				
5PD-Liquidation(P)[a]				
5YD-Liquidation(Y)	0.3080	0.9992	0.05	0.8279

TABLE 5.5

CONTINUED

Variable	Standard Coefficient	Wilks' Lambda	F-Ratio	Significance
6PD-Operating Losses(P)[a]				
6YD-Operating Losses(Y)[a]				
7APD-Discontinued Operations(P)[a]				
7AYD-Discontinued Operations(Y)	-0.3092	0.9463	3.23	0.0774
7FYD-Proceeds from Sale of Stock(Y)[a]				
7YGD-Opinions Regarding Future Profitability(Y)	0.1711	0.9873	0.73	0.3959
8AYD-Market for Firm's Stock(Y)	-0.1463	0.9766	1.37	0.2469

[a] Variable is a constant (no non-zero observations).

TABLE 5.6

ALTERNATIVE CODING CLASSIFICATION ACCURACY

Actual Group	Percent Correct	Predicted Worthless	Predicted Not Worthless
Tax Court Model			
Worthless	81.1	129	30
Not Worthless	81.7	31	138
Total	81.4	160	168
Federal District Court Model			
Worthless	97.1	33	1
Not Worthless	80.0	5	20
Total	89.9	38	21

Examining the overall Wilks' Lambda values for models based on the two coding schemes models also indicated no significant differences. For the original Tax Court model the Wilks' Lambda value is 0.6651 and for the alternative coding model this value is 0.6346, and for the Federal district court models the respective Wilks' Lambda values are 0.3741 and 0.3365. Since the alternative coding models are not significantly different from the original coding models but involve the use of twice as many variables, models using the less complex original coding scheme were used in the analysis of remaining research questions.

Logit Analysis

Model construction. The SAS LOGIST program was used to develop the logit models of Tax Court and Federal district court decisions which are presented in Tables 5.7 and 5.8. The coefficients from these models provide a basis to calculate the probability of group membership for each decision. A probability score of less than .5 resulted in the case being classified as worthless and a score of .5 or higher resulted in the case being classified as not worthless. To derive probability estimates from the models' coefficients, a log-odds ratio must be calculated for each case by applying the coefficients to the raw data which may then be converted into a probability score through the following transformation

TABLE 5.7

TAX COURT LOGIT MODEL COEFFICIENTS AND CLASSIFICATION ACCURACY

Variable	Beta Coefficients	Chi-Square Statistic	Significance
1P-Insolvency(P)	1.7588	27.28	0.0000
1Y-Insolvency(Y)	-1.3720	26.75	0.0000
2P-Receivership(P)	0.7520	4.28	0.0385
5P-Liquidation(P)	0.5487	1.03	0.3112
5Y-Liquidation(Y)	-1.3050	17.88	0.0000
6P-Operating Losses(P)	0.7307	4.77	0.0289
6Y-Operating Losses(Y)	0.2560	0.44	0.5053
7AP-Discontinued Operations(P)	0.8836	6.10	0.0136
7AY-Discontinued Operations(Y)	-1.0837	13.03	0.0000
7BP-Market for Principal Products(P)	-1.018	0.05	0.8312
7BY-Market for Principal Products(Y)	0.1696	0.15	0.6973
7GY-Opinion Regarding Future Profitability	-0.1673	0.22	0.6363
Intercept	0.0860	0.12	0.7261

Actual	Percent Correct	Predicted	
		Worthless	Not Worthless
Worthless	80.5	128	31
Not Worthless	80.5	33	136
Total	80.5	161	167

TABLE 5.8

FEDERAL DISTRICT COURT LOGIT MODEL COEFFICIENTS AND CLASSIFICATION ACCURACY

Variable	Beta Coefficients	Chi-Square Statistic	Significance
1P-Insolvency(P)	3.8994	4.39	0.0361
1Y-Insolvency(Y)[a]	-18.3950	N/A	N/A
2P-Receivership(P)	-2.1282	1.52	0.2171
2Y-Receivership(Y)	-3.2761	0.01	0.9290
4P-Bankruptcy(P)	0.3044	0.05	0.8286
5P-Liquidation(P)	3.7570	4.65	0.0311
5Y-Liquidation(Y)	0.3413	0.06	0.8024
6P-Operating Losses(P)	0.7796	0.26	0.6131
6Y-Operating Losses(Y)	1.0817	0.57	0.4520
7AP-Discontinued Operations(P)	0.2258	0.04	0.8473
7AY-Discontinued Operations(Y)	-4.1020	3.79	0.0515
7FY-Proceeds from Sale of Stock(Y)	-0.3573	0.06	0.8139
7GY-Opinions Regarding Future	0.0860	0.12	0.7261
Profitability(Y)	-0.3893	0.07	0.7963
8AY-Market for Firm's Stock(Y)[a]	6.0926	N/A	N/A
Intercept	-1.6884	1.50	0.2210

Actual	Percent Correct	Predicted	
		Worthless	Not Worthless
Worthless	91.2	31	3
Not Worthless	88.0	3	22
Total	89.8	34	25

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[a] Beta coefficient assumed to be infinite by SAS LOGIST program.

$$P = \frac{e^L}{1 + e^L}$$

where

P = probability estimate and

e^L = anti-log of the predicted log-odds.

The high values of the coefficients for variables 1Y-Insolvency(Y) (-18.3950) and 8YA-Market for Firm's Stock(Y) (6.0926) in the Federal district court model is due to the fact that infinite values were assigned to the coefficients for these two variables by the SAS LOGIST program. The infinite coefficient values assigned to both of these variables were the result of empty cells in the cross-tabulation of court decisions and variable codings used to calculate the log-odds ratios. While one ordinarily would not report results in this situation, the equation is included to provide logit results parallel to the discriminant function results. The coefficient could not be estimated because there were no cases in which the court discussed insolvency in the claimed year of loss and found the stock in question to be not worthless. The predictive strength of Insolvency (Y) is also found in the discriminant model, but its estimation does not depend on the absence of empty cells.

Classification accuracy. The classification accuracy of the Tax Court model (80.5 percent) is identical to that of the discriminant model. An examination of 64 decisions misclassified by each model indicated that 2 decisions misclassified by the logit model were correctly predicted by the discriminant model and 2 decisions misclassified by the discriminant model were correctly predicted by the logit model. This indicates that discriminant and logit models are almost identical in predicting Tax Court decisions for the worthless stock issue.

The classification accuracy of the Federal district court logit model (89.8 percent) is 1.7 percent less than that of the discriminant model (91.5 percent). Three of the 6 decisions misclassified by the logit model were correctly predicted by the discriminant model and 2 of the 5 decisions that were misclassified the discriminant model were correctly predicted by the logit model. These small differences indicate that discriminant and logit models are similar in their ability to predict court decisions, but that discriminant analysis may better fit the decisions into the model. Some of the difference between the Federal district court decisions predicted by the discriminant analysis and logit models may be attributable to the infinite coefficient values generated by the SAS LOGIST program. Discriminant analysis models were used in analysis of the remaining research questions since nothing was discovered to indicate that use of the logit models would be preferable and no variables were assigned infinite valued coefficients.

Summary of Model Characteristics

Table 5.9 presents a summary of variables significant at the .05 level from discriminant analysis models using both coding schemes and logit models for Tax Court and Federal district courts. Even though variables used in each of the three models for the Tax Court and Federal district court decisions differ by as many as five variables, the respective classification accuracies of models in each group vary by less than 1.7 percent. This small difference may be attributed to relatively low contribution, by variables that differ between models to the respective classification functions of these models and the ranking of insolvency as one of the three top variables for each model.

Research Question 3

In Chapter IV an heuristic model, derived from a synthesis of statutory provisions and court decisions, was described. Table 5.10 presents this model's classification accuracy. Decisions from the Tax Court were correctly predicted for 72.9 percent of the cases and for decisions from the Federal district courts, 83.1 percent were correctly predicted. These percentages are 7.6 and 8.4 percent less than those obtained in the discriminant analysis models which provide support for the assumption that, in this study, mathematical models are superior to an heuristic model. The heuristic and discriminant analysis

TABLE 5.9

SUMMARY OF VARIABLES SIGNIFICANT AT THE .05 LEVEL AND MODEL CLASSIFICATION ACCURACY

	Tax Court Models[a]			Federal District Court Models		
	Original Coding	Alternate Coding	Logit	Original Coding	Alternate Coding	Logit
1P-Insolvency(P)	1	1	1	3	3	3
1Y-Insolvency(Y)	2	2	2	1	1	1
1YD-Insolvency(Y)		9			2	
2P-Receivership(P)	6	5	6			
5P-Liquidation(Y)	7	8		2	4	4
5Y-Liquidation(Y)	3	3	3	4	5	
6P-Operating Losses(P)			7			
7AP-Discontinued Operations(P)	5	4	5			
7AY-Discontinued Operations(Y)	4	6	4	5	6	
7AYD-Discontinued Operations		7				
8AY-Market for Firm's Stock						2
Classification Accuracy (%)	80.5	81.4	80.5	91.5	89.8	89.8

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[a] Variables are ranked according to the absolute values of their coefficients.

TABLE 5.10

HEURISTIC MODEL CLASSIFICATION ACCURACY

Actual Group	Percent Correct	Predicted Worthless	 Not Worthless
	Tax Court Model		
Worthless	79.9	127	32
Not Worthless	66.3	57	112
Total	72.9	184	144
	Federal District Court Model		
Worthless	91.2	31	3
Not Worthless	72.0	7	18
Total	83.1	38	21

models are not as similar as the difference in classification accuracy percentages may indicate. The heuristic model classified 40 Tax Court decisions (12.2 percent) and 7 Federal district court decisions (11.9 percent) differently than did the discriminant analysis models. While the heuristic model is not as accurate as the mathematical models, it does classify decisions better than random assignment based on the probabilities of group membership.

Research Question 4

Two tests for temporal stability of the Tax Court models were performed. First, decisions prior to 1941 (159 decisions) were used to develop a discriminant function that was used to classify decisions made after 1940 (169 decisions). Data to validate results of this test was obtained by using the heuristic model to classify decisions from each of these time periods. Second, to assess the current validity of these models, the same procedures were used for decisions prior to 1968 (295 decisions) and decisions after 1967 (33 decisions).

The classification accuracy related to decisions from each group of decisions is presented in Tables 5.11 and 5.12. The ability of the pre-1941 discriminant model to correctly classify 78.0 percent of decisions from the pre-1941 time period and 76.9 percent of the post-1940 decisions, when compared with the 80.5 percent

TABLE 5.11

PRE-1941 AND POST-1940 CLASSIFICATION ACCURACY

Actual Group	Percent Correct	Predicted Worthless	Predicted Not Worthless
Discriminant Model			
	Pre-1941 Decisions		
Worthless	76.5	62	19
Not Worthless	79.5	16	62
Total	78.0[a]	78	81
	Post-1940 Decisions		
Worthless	78.2	61	17
Not Worthless	75.8	22	69
Total	76.9	83	86
Heuristic Model			
	Pre-1941 Decisions		
Worthless	77.8	63	18
Not Worthless	61.5	30	48
Total	69.8[b]	93	66
	Post-1940 Decisions		
Worthless	82.1	64	14
Not Worthless	70.3	27	64
Total	75.7	91	78

[a] Overall Model Classification Accuracy (%) = 80.5.

[b] Overall Model Classification Accuracy (%) = 72.9.

TABLE 5.12

PRE-1968 AND POST-1967 CLASSIFICATION ACCURACY

Actual Group	Percent Correct	Predicted: Worthless	Predicted: Not Worthless
Discriminant Model			
Pre-1968 Decisions			
Worthless	81.4	118	27
Not Worthless	82.0	27	123
Total	81.7[a]	145	150
Post-1967 Decisions			
Worthless	71.4	10	4
Not Worthless	57.9	8	11
Total	63.7	18	15
Heuristic Model			
Pre-1968 Decisions			
Worthless	80.0	116	29
Not Worthless	66.7	50	100
Total	73.2[b]	166	129
Post-1967 Decisions			
Worthless	78.6	11	3
Not Worthless	63.2	7	12
Total	69.7	18	15

[a] Overall Model Classification Accuracy (%) = 80.5.

[b] Overall Model Classification Accuracy (%) = 72.9.

classification accuracy of the overall model, indicate the year in which cases were decided is not a significant factor in the discriminant model. Similarly, classification accuracies of 69.8 percent for pre-1941 decisions and 75.7 percent for post-1941 decisions, versus 72.9 percent for the overall heuristic model indicate when cases were decided does not have significant effect on the ability of an heuristic model to predict these decisions.

Analysis of classification accuracies for pre-1968 and post-1967 models are not as easy to interpret. For the discriminant model, a classification accuracy of 81.7 percent was obtained for the pre-1968 model. However, when this model was applied to post-1967 decisions a classification accuracy of only 63.7 percent was obtained. This difference was not nearly as large as when the heuristic model was applied to these two groups of decisions. Respective classification accuracy percentages for pre-1968 and post-1967 decisions were 73.2 and 69.7. Differences between the discriminant and heuristic models in predicting decisions and the relatively small number of decisions in the post-1967 group (33 decisions) limit use of the 18 percent difference in decisions correctly predicted by the pre-1968 and post-1967 discriminant models as a basis for concluding the Tax Court has recently changed the manner in which it decides worthless stock cases.

To discover more about classification accuracy differences between the pre-1968 and post-1967 discriminant models, the temporal distribution of the Tax Court decisions was examined. This examination disclosed that 50 percent of the decisions were made during a 9-year period from 1937 through 1945, while two groups, each constituting 25 percent of the decisions were made during the 16-year period from 1921 through 1936 and the 37-year period from 1946 through 1982. Discriminant functions and related classification accuracy percentages were developed for the decisions from each group. Classification accuracy percentages were 79.7 percent for the 1937 through 1945 group, 85.6 percent for the pre-1937 group, and 75.9 percent for the post-1945 group. Using the model from the 1937-1945 group to classify decisions from the other two groups of decisions resulted in percentages of correctly predicted decisions of 75.9 percent and 66.3 percent, respectively (9.2 percent and 9.6 percent less than when classified by the discriminant models developed from the decisions from each group). The similar and relatively small effect that the discriminant model based on the decisions drawn from the center of the temporal distribution of all Tax Court decisions has on the classification accuracy of decisions drawn from the two groups of the decisions does not provide strong support for a conclusion that a recent change has occurred in the Tax Court's decision process regarding Code Section 165(g) issues. A possible explanation for the difference between the classification accuracy differences may be in the nature of cases heard by the judges (losses arising out of business failures related to a widespread economic depression versus losses arising from business failures that occur during periods of relative economic prosperity) and the frequency that judges make decisions regarding worthless stock losses.

Research Question 5

To determine whether the choice of legal forum (Tax Court or Federal district court) has an effect on worthless stock decisions, an approach similar to that used in answering the temporal stability question was used. The SAS DISCRIM program was used to construct models based on separate decisions from each forum that were used to classify decisions from the other forum.

Correct classification percentages for decisions predicted by models based on the respective decisions from each forum and the models based on decisions from the other forum are presented in Table 5.13. Using the Tax Court model to classify Federal district court decisions resulted in a 81.4 percent classification accuracy which is 10.1 percent less than the ability of the Federal district court model to classify its own decisions. Application of the Federal district court model to Tax Court decisions correctly classified 68.9 percent of the decisions versus 80.5 percent when these decisions were classified by the Tax Court model. The heuristic model also produced substantially different percentages of correctly predicted decisions. Only 72.9 percent of the Tax Court decisions were correctly classified while 83.1 percent of the Federal

TABLE 5.13

CHOICE OF FORUM CLASSIFICATION ACCURACY

Actual Group	Percent Correct	Predicted Worthless	Predicted Not Worthless
Federal District Court Decisions Classified by the Tax Court Model			
Worthless	73.5	25	9
Not Worthless	92.0	2	23
Total	81.4[a]	27	32
Tax Court Decisions Classified by the Federal District Court Model			
Worthless	83.0	132	27
Not Worthless	55.6	75	94
Total	68.9[b]	157	171

[a] Classification Accuracy of Federal district court decision classified by the Federal district court model = 91.5%.

[b] Classification Accuracy of Tax Court decisions classified by the Tax Court Model = 80.5%.

district court decisions were correctly predicted as is shown in Table 5.10. Differences in classification accuracies of the discriminant models and the heuristic model indicate that whether a case was decided in the Tax Court or one of the Federal district courts has an effect on how the case was decided. Another indication of differences between these examining models was found by the standardized coefficients and significance values for the variables in each model. Tables 5.3 and 5.9 indicate variables 2P-Receivership(P) and 7AP-Discontinued Operations(P) were significant at the 0.05 level in the Tax Court model but not in the Federal district court model. The source of differences between the decision models is not clear, but may be a potential result of different decision-procedures, differences in the nature of cases that each court decides, or the difference in the number of decisions used to construct each model.

Research Question 6

Two types of tests were performed to assess the sensitivity of the models to errors in coding the variables of interest. First, effects of random coding errors were assessed by randomly changing the original coding of 3 percent and 10 percent of the variables in each model. Second, to assess the effects of systematic coding errors, changes were made in the original coding for the two most significant variables from each model.

Table 5.14 presents the effects of modifying the original coding of variables by introducing random coding errors in the Tax Court and Federal district court models. Randomly changing the original coding for 3 percent of the variables resulted in models with variables significant at the 0.05 level that were identical to the variables from models based on the initial coding, but classification accuracies that were respectively 3.7 percent and 1.7 percent less than the originally coded models. Randomly changing the original coding for 10 percent of the variables resulted in more pronounced changes for both models. In the Tax Court model, the sixth- and seventh-ranked variables [2P-Receivership(P) and 5P-Liquidation(P)] were no longer significant at the 0.05 level and the classification accuracy of the model was reduced by 7.9 percent. For the Federal district court model, a sixth variable [7AP-Discontinuation of Operations(P)] became significant at the 0.05 level. The second- and third-ranked variables [1P-Insolvency(P) and 5P-Liquidation(P)] failed to remain significant at the 0.05 level, and classification accuracy dropped by 10.2 percent. These findings indicate that both models are robust with respect to low levels of random coding errors and provide support for the assumption that the less than 1 percent error rate that was assumed to exist in coding the data used in this study would have an insignificant effect on the models constructed from these data.

TABLE 5.14

EFFECTS OF RANDOM ERROR

	Effect on Significance[a] of Individual Variables		Effects on Model	
Level of Introduced Random Error	Variables Becoming Significant	Variables Ceasing to Be Significant	Classification Accuracy (%)	Wilks' Lambda
		Tax Court Model		
No Error	N/A	N/A	80.5	0.6650
3%	None	None	76.8	0.7017
10%	None	2P(0.0976)[b] 5P(0.4770)[b]	72.6	0.7815
		Federal District Court Model		
No Error	N/A	N/A	91.5	0.3740
3%	None	None	89.8	0.4099
10%	7AP(0.0205)	1P(0.3007)[b] 5P(0.5566)[b]	81.3	0.5579

[a] 0.05 level.

[b] New level of significance.

In Table 5.15, effects of introducing systematic errors in the coding of the two most significant variables from each model are presented. Both models were similarly affected by the introduction of systematic coding errors. Each coding change resulted in a different F-Ratio, Wilks' Lambda, and significance levels for the affected variables. These values were the same in the original model and the incorrectly coded models for all variables that were not changed. The changes in the significance for the modified variables resulted in changes to the standardized coefficients of all variables. In all but three instances, this change in standardized coefficient values resulted in reductions of model classification accuracy that ranged from 1.5 percent to 11.8 percent. The three instances when no change in classification accuracy was observed occurred in the Federal district court model when the coding of variable 5P-Liquidation(P) was modified. This anamolous result occurred because the original coding of this variable resulted in either a value of 1 or a value of 0 being assigned to all 59 decisions. Except for the case in which the coding of this variable was modified by exchanging 0's and 1's converting a variable into a constant, other coding changes did not affect the relative distribution of variables used to construct the models. As with the introduction of random error, both models were robust with respect to the introduction of systematic coding errors.

TABLE 5.15

EFFECTS OF SYSTEMATIC ERROR

Change in Coding[a]	Values for Changed Variable				Model Classification Accuracy (%)
	Standard Coefficient	Wilks' Lambda	F-Ratio	Significance	
	Tax Court Model--Variable 1P-Insolvency(P)				
No Change	-0.5670	0.9120	31.47	0.0000	80.5
0 to 1 1 to 0	-0.2898	0.9918	2.86	0.1022	73.2
0 to -1 -1 to 0	-0.5441	0.9126	31.24	0.0000	79.0
1 to -1 -1 to 1	0.4915	0.9398	20.88	0.0000	76.5
	Tax Court Model--Variable 1Y-Insolvency(Y)				
No Change	0.5553	0.9070	33.44	0.0000	80.5
0 to 1 1 to 0	-0.3965	0.9809	6.34	0.0123	76.2
0 to -1 -1 to 0	0.4936	0.9116	31.60	0.0000	77.1
1 to -1 -1 to 1	0.3155	0.9549	15.42	0.0001	74.4

TABLE 5.15

CONTINUED

Change in Coding[a]	Values for Changed Variable				Model Classification Accuracy (%)
	Standard Coefficient	Wilks' Lambda	F-Ratio	Significance	
	Federal District Court Model--Variable 1Y-Insolvency(Y)				
No Change	0.7289	0.8887	25.78	0.0000	91.5
0 to 1 1 to 0	0.6752	0.9271	4.479	0.0387	88.1
0 to -1 -1 to 0	0.5908	0.7264	21.47	0.0000	88.1
1 to -1 -1 to 1	-0.2582	0.8625	9.08	0.0038	79.7
	Federal District Court Model--Variable 5P-Liquidation(P)				
No Change	-0.5691	0.8104	13.33	0.0006	91.5
0 to 1 1 to 0	No values--Variable was transformed into a constant				88.1
0 to -1 -1 to 0	-0.5691	0.8104	13.33	0.0006	91.5
1 to -1 -1 to 1	-0.5691	0.8104	13.33	0.0006	91.5

[a] Coding changes were made separately.

Comparison With Related Study

In one recent study, the worthless stock issue has also been examined. Kilpatrick used both stepwise discriminant analysis and a stepwise logit analysis to determine the significant factors used by the Tax Court in eighty-four worthless stock decisions.[6] Kilpatrick also assessed the stability of these models over the period of time from 1926 to 1982. His results indicated that both models were stable over this time period and that Insolvency in the Claimed Year of Loss, Discontinuance of Operations in the Claimed Year of Loss, Dissolution in the Claimed Year of Loss, Bankruptcy After the Claimed Year of Loss, and Insolvency After the Claimed Year of Loss were the variables significant at the 0.05 level in both the discriminant and logit models. These models correctly classified 88.1 percent and 86.9 percent of the decisions, respectively. Unfortunately, direct comparisons between the Kilpatrick study and this research are not possible because of the differences in the cases selected for analysis and the manner in which they were analyzed. This study examined 348 Tax Court decisions versus 86 for the Kilpatrick study. Only variables occurring in 10 percent or more of the decisions were used to construct the discriminant and logit models in this study. The models in the Kilpatrick study, on the other hand, included all variables to a minimum occurrence rate threshold. This study used all possible variables in developing the discriminant and logit models while the Kilpatrick study used a stepwise procedure. (See page 99 for a discussion of this difference.) Because of differences in research designs, it is only possible to make general comparisons between Kilpatrick's research and this study.

Three of the variables that Kilpatrick found significant in his models were also found to be significant in this study. These variables are Insolvency During the Claimed Year of Loss, Liquidation During the Claimed Year of Loss, and Discontinuation of Operations During the Claimed Year of Loss. The other two variables that Kilpatrick found significant (Bankruptcy After the Claimed Year of Loss and Insolvency After the Claimed Year of Loss) were not examined in this study since the occurrence rate of nonzero coded values were 3 percent and 2 percent, respectively. This may indicate that stepwise models can include variables that have little relationship with the variables that occur in the majority of worthless stock decisions. Similarities between the discriminant and logit models were found in both studies. Also, both studies found that the discriminant models were temporally stable.

Notes

[1] E.S. Gilbert, "On Discrimination Using Qualitative Variables," 63 Journal of the American Statistical Association 1399 (1968); and W.J. Krzanowski, "Discrimination Using Both Binary and Continuous Variables," 70 Journal of the American Statistical Association 782 (1968).

[2] N. Nie, Statistical Package for the Social Sciences (New York: McGraw-Hill, Inc., 2d ed., 1975).

[3] W.R. Klecka, Discriminant Analysis (Beverly Hills: Sage Publications, 1980).

[4] Id.

[5] Id.

[6] B.G. Kilpatrick, The Determination of Worthless Securities Under Internal Revenue Code Sec. 165(g): Empirical Evidence from Judicial Decisions (Ph.D. dissertation, Oklahoma State University, 1984).

CHAPTER VI

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

In Chapter I, six research questions were presented dealing with the determination of when stock becomes worthless for tax purposes. The first question related to the identification of variables that are useful in determining when stock becomes worthless.

> Research Question 1: What variables or factors have been relevant in court decisions that have determined whether stock is worthless for purposes of loss recognition under Code Section 165(g)?

The objective of the second research question was to determine the variables from Research Question 1 that were significant in discriminant and logit models predicting the outcome of worthless stock decisions.

> Research Question 2: Mathematically, how have the courts weighted the variables identified in Question 1?

Since it has not been established that mathematical models are superior to heuristic models, the third research question was designed to determine how different these two types of models are in their ability to correctly predict the outcome of worthless stock decisions.

Research Question 3: How accurate is the model developed in the answer to Question 2 when compared to an heuristic model based on a synthesis of statutory provisions and court decisions?

Since taxpayers may choose to have worthless stock issues decided in either the Tax Court, a Federal district court, or the U.S. Claims Court, the fourth research question was designed to assess whether the choice of legal forum has an effect on the outcome of worthless stock decisions.

Research Question 4: Do differences in the court of original jurisdiction affect the accuracy of the models from Questions 2 and 3?

The decisions analyzed in this study span a sixty-two-year period of time from 1921 to 1983. The fifth research question was designed to determine if the courts have been consistent in the way they have decided worthless stock issues over this period of time.

Research Question 5: Are the models from Questions 2 and 3 temporally stable?

Because it is possible for the biases of a researcher to affect the coding of variables selected for analysis, the sixth research question was designed to assess the effect of coding errors on the mathematical models used in this study.

Research Question 6: How sensitive is the model from Question 2 with respect to errors in the coding of the independent variables selected for analysis?

This chapter summarizes results for the preceding research questions. Following the summary and conclusions, recommendations derived from this study's results will be presented along with suggestions for future research.

Summary and Conclusions

Since the inception of the federal income tax, no statutory provisions, administrative interpretations, or precedent-setting court decisions have specified the conditions that must be satisfied to demonstrate that a security is worthless for the purposes of loss deductibility under Code Section 165(g). Because of this lack of guidance, issues involving conflicts between taxpayers and the IRS regarding whether securities are worthless for tax purposes have and continue to be referred to the courts for resolution.

Historical Background

Chapter II presents a concise history tracing the development of the statutory provisions, administrative interpretations, and judicial decisions related to the determination of whether stock is worthless for tax purposes. Statutory provisions have provided for the deductibility of losses related to securities that become worthless during the taxable year, but have yet to specify the conditions necessary to establish worthlessness. The major statutory change in provisions related to worthless securities occurred in the Revenue Act of 1938 which changed the character of worthless stock losses from ordinary to capital. Generally, the administrative interpretations of the worthless stock provisions have only described some conditions that do not indicate worthlessness. They typically have not specified what conditions establish worthlessness. The primary source of guidance in determining whether stock is worthless for tax purposes has been the approach adopted by the courts in resolving issues of this nature. The courts have determined that it is necessary to establish that stock lost both current and future value during the claimed year of loss in order to establish that stock is worthless for tax purposes. This approach was initially described in the Morton decision where the Tax Court proposed the "identifiable event" concept.[1] This concept involves the search for an event of such significance that it eliminates both the prospects of current and future value for the stock in question.

Variable Identification

Having determined that the search for one or more "identifiable events" is the critical factor in establishing that stock is worthless for tax purposes, it was necessary to determine those events that have been discussed in this context by the courts. A review of tax literature and court decisions identified eighty-four variables the courts have considered as evidence establishing that a specific stock's current and future value were extinguished during the claimed year of loss. An examination of these variables indicated that the occurrence rate for some of these variables in the selected court decisions was very low. In order to avoid the construction of models possibly including variables that taxpayers would most likely never experience, a 10 percent minimum occurrence rate threshold was established for accepting variables for analysis in this study. Variables satisfying this threshold for Tax Court and Federal district court decisions are presented in Table 3.2.

Decisions from the U.S. Claims Court were not analyzed since only eight decisions from this court were identified. With so few observations, it is highly unlikely that a statistically valid model could be constructed.

Empirical Results

Three hundred and forty-eight Tax Court cases and 59 Federal district court decisions were analyzed in this study. Each case was read to determine the presence or absence of the variables selected for analysis and the context in which they were discussed. Chapter V presents the relationship between these decisions and the Research Questions of this study.

Research Question 2. Two general types of mathematical models were selected to analyze the decisions from each court. A discriminant model was selected on the assumption that judges linearly combine the identified variables in reaching their decisions. Alternatively, a logit model was also selected on the assumption that judges use a nonlinear combination of identified variables in reaching their decisions.

The variables significant at the .05 level in each of these models and the respective classification accuracies for each model are presented in Table 5.9. An examination of variables that were not significant at the .05 level revealed a strong relationship between shareholder recoveries after the claimed year of loss and the court's decision. If the shareholder received a subsequent liquidating distribution or equity in the reorganized corporation, the stock was found not to be worthless. A comparison between the classification accuracies of the discriminant and logit models indicates that both models are equal in their ability to correctly classify Tax Court decisions (80.5 percent) and for Federal district court decisions, the discriminant model correctly classified 1.7 percent more decisions than did the logit model (91.5 percent versus 89.8 percent). This slight difference does not clearly establish a "best" model, but was used as a basis to select the discriminant model for use in analyzing the remaining Research Questions.

Research Question 3. Traditional legal research was used to synthesize statutory decisions and court decisions into an heuristic model to determine whether this type of model could correctly classify more decisions than could the discriminant models. The heuristic model correctly classified 72.9 percent of the Tax Court decisions versus 80.5 percent for the discriminant model. The heuristic model correctly classified 83.1 percent of the Federal district court decisions versus 91.5 percent for the discriminant model. These differences provide support for the use of mathematical versus intuitive models (at the aggregate level) to predict decisions for the cases included in this study.

Research Question 4. Because the decisions included in this study span a sixty-two year period, tests of temporal stability were performed. First, a discriminant model was developed from pre-1941 decisions that was used to classify both the pre-1941 and post-1940 decisions to test the overall stability of the model. Second, this approach was also used for pre-1968 and post-1967 decisions to test the current validity of the model. Differing percentages of correctly classified decisions for the reference models and test groups would indicate the model is changing over time. Since only fifty-nine Federal district court decisions were identified, it is unlikely that statistically meaningful results could be obtained for these decisions; so, only Tax Court decisions were tested.

The pre-1941 discriminant model was able to correctly classify 78.0 percent of decisions from this group and 76.9 percent of the post-1940 decisions. This small difference does not provide a strong basis for concluding that the overall model has changed over time. The result of the current validity test were respective classification accuracy percentages of 81.7 and 63.7 for the pre-1968 and post-1967 groups. Simple interpretation of this 18 percent difference would indicate a recent change in the Tax Court decision model; however, when the size of the post-1967 group (33 decisions) is considered, such a conclusion must be qualified.

Research Question 5. To determine if a difference exists between the decision models of the Tax Court and Federal district courts, a procedure similar to the temporal stability tests was employed. Decisions of the Tax Court were used to construct a discriminant model that classified Federal district court decisions and decisions of the Federal district courts were similarly used to construct a discriminant model used to classify Tax Court decisions. Differing percentages of correctly predicted Tax Court and Federal district court decisions would indicate a difference between these models.

Using the Tax Court and Federal district court models to classify decisions from the other forum reduced the percentage of correctly classified decisions by 10.1 percent for Tax Court decisions and 11.6 percent for the Federal district court decisions. This reduction in correctly predicted decisions indicates a difference between the decision models of the Tax Court and Federal district courts, but does not indicate whether this difference is due

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to differing judicial decision processes, differences in the nature of cases that taxpayers choose to have each court decide, or a statistical anomaly attributable to the difference between the number of decisions in each group (348 Tax Court decisions versus 59 Federal district court decisions).

Research Question 6. Since the findings of this research may include analysis of variables that were incorrectly coded, it was necessary to assess the sensitivity of the research findings to coding errors. The effects of both random and systematic error were considered. The effect of random error was assessed by determining the change in model classification accuracy and changes in variables significant at the .05 level when random error was introduced to 3 percent and 10 percent of the variables used in developing these models. The effect of systematic error was determined by separately reversing the coding of each model's two most significant variables.

A 3 percent level of random error reduced the classification accuracy percentages of the Tax Court and Federal district court models by 3.7 percent and 1.7 percent, respectively, but did not result in changing the significant variables in either model. At the 10 percent level, two variables failed to remain significant for the Tax Court model and the classification accuracy percentage decreased by 7.9 percent. For the Federal district court model, 2 variables failed to remain significant, 1 variable became significant, and the classification accuracy percentage decreased by 10.2 percent. Systematic errors in the coding for each of the four selected variables resulted in reductions of classification accuracy percentages ranging from 1.5 percent to 11.8 percent. These findings support the assumption that an estimated occurrence rate of random coding errors in this study (less than 1 percent) should have an insignificant effect on related research findings.

Recommendations

The respective abilities of the 7-variable Tax Court and 5-variable Federal district court models to correctly predict 80.5 and 91.5 percent, respectively, of the decisions selected for analysis indicate results of this study may be useful to tax policy-makers as a basis for developing an operational definition of stock that is worthless for purposes of Code Section 165(g) loss recognition. Tax policy-makers could also use the results of this study to specify "safe-harbor" conditions which, if satisfied by taxpayers, can establish qualification for loss recognition under Code Section 165(g).

The first taxable year in which a shareholder could establish that the following three conditions have been satisfied would adequately demonstrate that both the current and future value of their stock has been extinguished for purposes of loss recognition under Code Section 165(g):

1. Normal operations of the corporation have been discontinued and no efforts to resume normal operations are being pursued,
2. The corporation is insolvent and the market value of its assets will not provide a return to shareholders when the corporation is liquidated, and
3. No efforts to reorganize the corporation are being undertaken which would result in realization of the current shareholders' equity interests.

These "safe harbor" conditions could apply equally to the stock of both publicly and privately held corporations. However, if the IRS were to review publicly traded stocks that have significantly declined in value to a nominal amount, say less than $1.00 per share, and determine which of these stocks they would consider worthless for purposes of Code Section 165(g) (perhaps on an annual basis), taxpayers would be able to avoid the transaction costs necessary to dispose of their shares to establish loss recognition outside of Code Section 165(g) and possible disallowance by the IRS based on a position that the stock became worthless in an earlier taxable year. Improved guidance for determining when worthless stock deductions will be allowed may reduce potential litigation from business failures of the recent economic recession, which would benefit both taxpayers and the IRS.

Taxpayers may find results of this study useful when considering litigation of a contested worthless stock deduction. The context of significant variables identified in this study and a search for other variables that the court may regard as "identifiable events" could provide taxpayers with an estimate of probable court decisions.

Suggestions for Future Research

The findings of this study provide two major topics for future research with broad applicability. First, differences between Tax Court and Federal district court models were identified, but it was not possible to attribute this difference to separate decision-making processes, the nature of cases decided by each court, or statistical properties of the models. Examining differences between decision models for other tax issues may provide an answer to this question. Identification of differing decision models would have significant planning implications for taxpayers. Second, the models developed in this study were found to be robust with respect to the introduction of errors in coding the variables of interest. Examining this relationship in future research may provide a basis for making broadly generalizable conclusions regarding the effects of observation error.

This study also provides opportunities for future research applicable to Code Section 165(g). Since this study only examined common stock decisions, the examination of worthlessness security decisions involving debt and preferred stock are possible subjects of future research.

Note

[1] Sterling Morton, 38 BTA 1270 (1938).

APPENDIX

LIST OF COURT DECISIONS ON WORTHLESS STOCK

Case (Number of Decisions)	Decision Year	Court*
Robert W. Aagaard	1971	TC
Henry Adamson	1929	TC
Adirondack Securities Corp.	1931	TC
E.B. Allen	1938	TC
John H. Amen	1948	TC
American Fork and Hoe Co.	1943	TC
American National Bank of St. Joseph v. U.S.	1950	DC
American President Lines, Ltd. v. Anglim	1942	DC
American Steel and Pump Corp.	1962	TC
American Utilization Co.	1938	TC
Ruben H. Anderegg	1978	TC
Carl E. Anderson	1946	TC
Arimel Corp. v. Rothensies	1941	DC
Robert W. Atkins	1938	TC
Atlantic Coast Line R.R. Co.	1944	TC
Joseph S. Auerbach (2)	1941	TC
The Austin Co., Inc.	1979	TC
Jane Bancroft v. U.S.	1940	CC

Case (Number of Decisions)	Decision Year	Court*
Robert J. Bannister	1937	TC
Robert Barbour	1939	TC
H.G. Barnes v. Glenn	1944	DC
John A. Barry	1925	TC
J. Kemp Bartlett	1939	TC
John H. Becker v. U.S.	1970	DC
Irvine F. Belser	1948	TC
Florance A. Benjamin	1933	TC
Thaddeus G. Benton	1962	TC
Rudolph Bergfeld	1930	TC
Aaron Berman	1946	TC
Katherine Dwight Berry	1954	TC
Milton H. Bickley	1925	TC
Birch Ranch and Oil Co.	1960	TC
Daniel C. Bleser Est.	1940	TC
Reese Blizzard	1929	TC
H.H. Bodzy	1962	TC
Lillian Boehm	1940	DC
Borden Mining Co.	1940	TC
R. Brandt	1942	TC
O.D. Bratton v. U.S.	1955	DC
Lewis Bremer	1940	TC
Sheldon B. Broadhead	1927	TC
George G. Brooks v. U.S.	1940	DC
D.H. Brown	1926	TC

Case (Number of Decisions)	Decision Year	Court*
John Crosby Brown	1932	TC
Oscar J. Brown v. Commissioner	1941	DC
Henning Bruhn	1928	TC
George F. Brumder v. U.S.	1944	DC
George A. Butler	1958	TC
Frank W. Byrne	1945	TC
Paul J. Byrum	1972	TC
Nellie H. Caldwell	1935	TC
Walter A. Camp	1953	TC
Capital Service, Inc.	1949	TC
John P. Carlson	1939	TC
Max G. Carey	1952	TC
Leigh Carroll	1930	TC
Claude D. Cass	1935	TC
Benjamin F. Castle	1945	TC
Ralph W. Chandless (2)	1943	TC
Theodore S. Chapman (4)	1939	TC
N.P. Christensen	1927	TC
Evelyn Clark	1944	TC
Lillie M. Clark	1927	TC
Roy C. Clark	1930	TC
George S. Clay	1939	TC
Charles F. Clippert	1939	TC
Frank L. Cohen	1937	TC
Rowena S. Coleman	1941	TC

Case (Number of Decisions)	Decision Year	Court*
W.C. Coleman	1934	TC
Gilbert Colgate	1950	TC
C. Carroll Collmus, Jr.	1929	TC
James A. Connelly	1940	TC
Henry S. Conover	1945	TC
C.E. Conover Co.	1927	TC
Continental Illinois National Bank v. U.S.	1981	DC
William H. Conyngham	1942	TC
Edwin Leo Coyle	1943	TC
Henry W. Cushman	1928	TC
F.W. Darling	1930	TC
Charles W. Deeds	1929	TC
Union C. DeFord	1930	TC
Erwin De Reitzes-Marienwert	1954	TC
Martin S. Dittman	1955	TC
Peter Doelger Brewing Co., Inc.	1931	TC
Harry Doerr	1942	TC
Richard M. Drachman	1955	TC
Robert D. Dresser v. U.S.	1932	CC
C. Harold Earle (2)	1945	TC
875 Park Avenue Co.	1953	TC
Eighteen Street Building Co. v. U.S.	1950	DC
E.B. Elliott Co.	1943	TC
Armand G. Erpf	1953	TC

Case (Number of Decisions)	Decision Year	Court*
Warde H. Erwin v. Granquist	1957	DC
Estand, Inc.	1941	TC
Oscar K. Eysenbach	1928	TC
Fairbanks, Morse Co. v. Harrison	1945	DC
Falls City Ice & Beverage Co., et al. (2)	1933	TC
J. Roy Fant	1941	TC
Farmers & Traders Bank	1926	TC
Leslie H. Fawkes	1929	TC
First National Bank of Minneapolis v. U.S.	1944	DC
Josie Millsaps Fitzhugh v. Nashville Trust Co., Exr.	1942	DC
John J. Flynn	1937	TC
Duncan M. Fort	1955	TC
H.V. Foster	1938	TC
W.N. Foster	1943	TC
Mortimer J. Fox	1941	TC
Franklin Pioneer Corp. v. Glenn	1945	DC
Donald A. Fraser	1942	TC
Frederick M. Frazier	1975	TC
Robert M. Freer	1978	TC
M. Lloyd Freese v. Jones	1945	DC
Milton H. Friend	1939	TC
William Gahagen	1931	TC

Case (Number of Decisions)	Decision Year	Court*
Launcelot J. Gamble v. U.S. (2)	1946	DC
Wilbert Garrison	1947	TC
James G. Geegan v. Heiner	1940	DC
A.S. Genecov v. U.S.	1968	DC
James Gilmore (2)	1974	TC
Sam B. Ginsburg	1974	TC
Joseph Glass	1943	TC
Glenmore Distilleries Co., Inc.	1942	TC
Sheldon R. Glenn v. Long	1942	DC
George Gliptis v. U.S.	1954	DC
C.A. Goding	1936	TC
Grover Glen Goe	1951	DC
Sol H. Goldberg	1937	DC
Dezso Goldner	1956	TC
Walter H. Goodrich and Co.	1939	TC
Albert Y. Gowen	1931	TC
C.T. Grant Est.	1937	TC
Alice H. Graves	1941	TC
Edward Greenberg	1971	TC
Julian A. Gregory v. Kelly	1942	DC
Randolf C. Grew	1939	TC
Fred Grittman	1928	TC
A.C. Gwynne	1931	TC
Edna C. Haley	1959	TC
Ruth Hall	1940	TC

Case (Number of Decisions)	Decision Year	Court*
Hall Paving Co. v. U.S. (2)	1974	DC
Don R. Hankey	1975	TC
W.W. Hanly	1927	TC
H.M. Hanna v. Routzahn	1936	DC
Hanna Iron Ore Co. of Delaware	1943	TC
John M. Harmon	1950	TC
Kenneth P. Harrington	1972	TC
Arthur W. Harrison	1941	TC
Charles Hart Est.	1955	TC
Ethel M. Hauk v. Huwe	1937	DC
C.L. Hayne Est.	1954	TC
Charles Heiss	1941	TC
Charles Heiss	1937	TC
Herberich, Hall, Harter Agency, Inc.	1944	TC
John W. Herrick	1977	TC
Hill Stores, Inc.	1941	TC
W.P. Hobby	1936	TC
Fred G. Hodges	1928	TC
Edward R. Hodgson	1979	TC
In re Hoffman	1936	DC
William L. Hoge	1942	TC
George H. Horning	1937	TC
Houghton and Dutton Co.	1932	TC
Harry C. Howard	1930	DC

Case (Number of Decisions)	Decision Year	Court*
William D. Howe Est.	1957	TC
D.F. Howell	1939	TC
William S. Hull	1940	TC
S.W. Huston v. U.S.	1951	DC
Imperial Elevator Co.	1932	TC
Industrial Rayon Corp.	1935	TC
Orrin H. Ingram	1942	TC
Iron Fireman Mfg. Co.	1945	TC
D.C. Jackling	1927	TC
Fred D. Jackson	1944	TC
Paul E. Jackson	1955	TC
Norman B. Jacobwitz	1968	TC
Jamieson Associates, Inc.	1938	TC
Simon Jankowsky	1930	TC
Joseph A. Jeffrey	1931	TC
William P. Jenks	1931	TC
Claude A. Jessup (2)	1977	TC
Jewell Ridge Coal Corp.	1962	TC
J.T.M. Johnston	1927	TC
Jones Co. (3)	1944	TC
Charlotte Jeannie Marguerite Jones	1942	TC
Clayton R. Jones	1938	TC
George C. Jones	1927	TC
Henry M. Jones	1926	TC

Case (Number of Decisions)	Decision Year	Court*
Paul H. Jones v. U.S.	1936	DC
R.D. Jones	1934	TC
Joslyn Mfg. and Supply Co.	1927	TC
John T. Kaler	1927	TC
Morgan S. Kaufman	1941	TC
Harry C. Kayser	1933	TC
Frank A. Keeney	1939	TC
Herbert M. Kieckhefer	1940	TC
Alice G.K. Kleberg	1943	TC
Junius C. Klein v. U.S.	1941	DC
James E. Knox	1939	TC
Geoffrey Konta	1942	TC
J. Harvey Ladew	1931	TC
Isaac E. Lambert	1939	TC
John H. Lang	1928	TC
Ernest T. Laubscher	1944	TC
Edward C. Lawson	1940	TC
M. Leavitt v. Hendricksen	1937	DC
E.S. Lee	1929	TC
Edith H. Leiper	1942	TC
Pierre J. LeLandais	1976	TC
Liebes and Co.	1931	TC
Joseph C. Lincoln	1955	TC
Harrison P. Lindabury	1940	TC
Helen M. Livesley	1960	TC

Case (Number of Decisions)	Decision Year	Court*
Julian M. Livingston	1942	TC
Dennis H. Long v. Glenn	1943	DC
George P. Lyon v. U.S.	1933	CC
Walter L. Maas	1941	TC
George Mackubin	1948	TC
William G. Maguire	1943	TC
Otto T. Mallery	1943	TC
Maud C. Markham v. Jones	1945	DC
Laurence Marks v. U.S.	1944	CC
John B. Marsh	1938	TC
Wilbur A. Marshall	1940	TC
Thomas H. Mastin v. U.S.	1938	DC
Edward Mattes	1942	TC
C.P. Mayer	1929	TC
Anthony J. McAlister, Jr.	1976	TC
Donald C. McClure	1946	TC
Isabella A. McDonnell	1943	TC
E.J. McMillan	1940	TC
Joseph H. McNabb	1940	TC
George N. Meissner	1944	TC
J.J. Melick	1927	TC
Elizabeth Melius Trust	1942	TC
John W. Mercer	1927	TC
William E. Metzger	1931	TC
Charles O. Middleton	1932	TC

Case (Number of Decisions)	Decision Year	Court*
Joseph Z. Miller	1942	TC
Cyrus C. Miller	1954	TC
Ray T. Miller	1945	DC
Anthony P. Miller, Inc.	1946	TC
Barnet S. Milman, Inc.	1938	TC
Robert Y. Moffat	1965	TC
Monmouth Plumbing Supply Co., Inc. v. U.S.	1933	DC
Robert H. Montgomery v. U.S.	1938	CC
Paul Moore v. Hoey	1940	DC
Richmond D. Moot	1942	TC
Nicholas Morey	1978	TC
Sterling Morton	1938	TC
Frederick C. Moser	1959	TC
Carl H. Mote	1941	TC
Arthur R. Munkwitz v. U.S.	1942	DC
Frank Nelson	1958	TC
New York Water Service Corp. v. Hoey et al.	1943	DC
B.E. Nickoll	1938	TC
North America Dye Corp.	1939	TC
Northwest Bancorporation	1935	TC
The Ohio Oil Co.	1942	TC
Olaa Sugar Co., Ltd.	1942	TC
E.C. Olson	1948	TC
Dana Osgood	1942	TC

Case (Number of Decisions)	Decision Year	Court*
Martin D. Ott (2)	1943	TC
Eugene Overton	1940	TC
Dudley R. Parsons	1944	TC
Katherine M. Paule	1933	TC
Mary S. Peabody	1938	TC
Gilbert H. Pearsall	1928	TC
Peoples National Bank of Charlottesville v. U.S.	1956	DC
Ralph Perkins	1940	TC
Peyser v. U.S.	1944	DC
Pine Ridge Coal Co.	1931	TC
Henriette Plaut v. U.S.	1944	CC
Troy V. Post	1979	TC
Floyd E. Poston	1929	TC
Homer M. Preston	1927	TC
Prosperity Co., Inc.	1932	TC
P.J. Quealy	1927	TC
Martin M. Quinn	1932	TC
Albert Raiss	1930	TC
Raleigh County Bank	1942	TC
Alton Ramsey	1951	TC
E.P. Raymond	1938	TC
Reading Co.	1941	TC
Real Estate Trust Co. of Philadelphia v. U.S.	1937	DC
William H. Redfield (2)	1936	TC

Case (Number of Decisions)	Decision Year	Court*
William M. Reese	1976	TC
Remington Typewriter Co.	1926	TC
Republic Cotton Mills	1940	TC
Edward E. Richards	1959	TC
William D. Richards	1976	TC
Henry M. Robinson	1930	TC
Jefferson D. Robinson, Jr.	1943	TC
Roosevelt Inv. Corp.	1941	TC
Louis Rosenberg	1946	TC
Ellene Z. Rosensteel	1942	TC
A.H. Rude & Co., Ltd.	1941	TC
Bert Ruud (2)	1969	TC
Daniel J. Ryan	1930	TC
Edward F.X. Ryan	1956	TC
Rafael Sabas	1973	TC
Albert Sabath	1937	TC
Isidor Sack	1938	TC
Harry Sandler	1931	TC
San Joaquin Brick Co.	1941	TC
Morris Sankary	1982	TC
Saylor Electric & Mfg. Co. v. U.S.	1939	DC
Bernard Schanfein	1942	TC
Isidor Schmeidler	1942	TC
George W. Schoenhut	1941	TC

Case (Number of Decisions)	Decision Year	Court*
Lemuel B. Schofield	1939	TC
Alamanda M. Schroeder v. U.S.	1940	DC
John G. Schroer	1945	TC
Harry O. Schwalbe Est.	1938	TC
Thomas P. Scifo (2)	1977	TC
Richard H. Scott (2)	1939	TC
Herman Senner	1931	TC
Stuart G. Shepard	1929	TC
Sheridan Meat Co.	1928	TC
Simon Sherman	1930	TC
Alexander C. Sherrard	1941	TC
J.A. Sherill v. Adkins	1939	DC
Alexander E. Shvetz	1979	TC
Edward H. Simmons Est.	1941	EC
Paris G. Singer	1975	TC
William A. Sipprell	1962	TC
Jerome C. Smith v. U.S.	1936	DC
Marion Smith	1941	TC
George P. Snow v. Marcelle	1950	DC
Southern Real Estate and Financial Co. (2)	1941	TC
Spokane Dry Goods Co. v. U.S.	1940	DC
Thomas Spurance Est.	1940	DC
Standard Asbestos Mfg. and Insulating Co.	1942	TC

Case (Number of Decisions)	Decision Year	Court*
Standard Knitting Mills, Inc.	1944	TC
State Bank of Springfield	1928	TC
Charles W. Steadman	1968	TC
Laura F. Stearns v. Kavanagh	1941	DC
Russell B. Stearns v. U.S.	1945	DC
Steffen Ice and Ice Cream Co.	1940	TC
William E. Steinback	1934	TC
Max Stern Est. (2)	1942	TC
John A. Stevenson	1940	TC
C.L. Stodalka	1943	TC
B.F. Sturtevant Co.	1942	TC
Summit Drilling Corp.	1946	TC
Henderson Supplee	1939	TC
John G. Sutton	1940	TC
Joseph L. Sweigard v. Rothensies	1941	DC
E.S. Taylor	1941	TC
Orville J. Taylor	1939	TC
William L. Taylor	1938	TC
Walter E. Templeman	1930	TC
Wesley V.E. Terhune	1939	TC
Textron, Inc. v. U.S.	1976	DC
W. Roosevelt Thompson	1939	TC
Thomas Thorkildsen	1925	TC
John Thun	1977	TC

Case (Number of Decisions)	Decision Year	Court*
Title Guarantee and Trust Co. v. U.S.	1941	DC
Edgar L. Tompkins	1937	TC
William C. Treuhoft	1942	TC
I.C. Triplett	1950	TC
Hayes Q. Trowbridge v. U.S.	1938	DC
Universal Consolidated Oil Co.	1961	TC
Van Deusen v. Phillips et al.	1937	DC
E.C. Van Diest, Jr. (Associated Engineers Co.) v. U.S.	1929	CC
Ezra Van Horn et al.	1942	TC
Vaudreuil Lumber Co.	1927	TC
Percy E. Wagner	1945	TC
E.O. Walgren	1926	TC
A.J. Wallace	1931	TC
Warfield Co. v. U.S.	1938	DC
John H. Watson (2)	1938	TC
James A. Weaver	1927	TC
Julius Weintraub v. U.S.	1939	DC
Arthur R. Wendell	1941	TC
Elizabeth H. Wesch v. Helburn	1933	DC
Wesson Oil and Snowdrift Co., Inc.	1940	TC
Powell White	1970	TC
United States v. S.S. White Dental Mfg. Co.	1925	CC
Louise Whitham	1951	TC

Case (Number of Decisions)	Decision Year	Court*
W.V. Whitson, Jr.	1946	TC
Virginia H. Wildes	1980	TC
Mary B. Williams	1940	TC
Arthur L. Winn, Jr.	1975	TC
J.H.G. Wolf	1921	TC
Worcester Bank and Trust Co.	1928	TC
Lester E. Yeager v. U.S.	1957	DC
Clifford Yewdall (2)	1954	TC
Minnie K. Young	1940	TC

*TC = Tax Court
DC = District Court
CC = U.S. Claims Court

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BIOGRAPHICAL SKETCH

Andrew Jackson Judd was born in Cincinnati, Ohio, on July 6, 1946, the son of Donald Stowe and Margaret Lodder Judd. After graduation from Lakes High School, Tacoma, Washington, in 1964, he attended Washington State University in Pullman, Washington, and the University of Washington in Seattle, Washington, served on active duty in the U.S. Army, attended Tacoma Community College in Tacoma, Washington, and received his Bachelor of Arts in Business Administration from the University of Washington in June, 1972. From 1972 to 1975 he was employed as a staff accountant by Arthur Andersen & Co. in Seattle, Washington. In August, 1973, he became a Certified Public Accountant in the State of Washington. In December, 1976, he received his Master of Business Administration degree from the University of Washington. In September, 1976, he accepted employment as an Instructor in Business at Seattle University in Seattle, Washington. He temporarily left that institution in September, 1977, to enter the Graduate School of the University of Florida in Gainesville, Florida.

He has two children (Thomas Benjamin and Anne Megan) who, as a result of the dissolution of a previous marriage, reside with him on Bainbridge Island, Washington.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

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Professor of Accounting

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

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This dissertation was submitted to the Graduate Faculty of the School of Accounting in the College of Business Administration and to the Graduate School, and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

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